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PROPHYLAXY OF BOVINE CONTAGIOUS PLEURO-PNEUMONIA.*

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For the fourth time the International Veterinary Congress has inscribed in its programme the question of prophylaxy of the contagious Pleuro-pneumonia of cattle. The meetings at Hamburg (1863), Zurich (1867), and Brussels (1883) not having given to this important question the solution it demanded, it is evidently required to submit it to a new examination.

If we consider the results which have been obtained in these later years in some neighbouring countries, notably in Switzerland, in the Grand Duchy of Baden, in Alsace-Lorraine, and in Holland, it may be affirmed that the time has come when, provided it is desired, the disease may be, if not completely stamped out, at least diminished to such an extent as to render it very little prejudicial to the interests of individuals and to agriculture. But to achieve this result it is indispensable that efficacious measures should be adopted in each one of the various tributary countries, with regard to their cattle traffic. In fact, what is the use of attempting the extinction, the complete extinction of Pleuro-pneumonia in a country, if it is not effectively combated in those with which it traffics ?

It will thus be seen that an efficacious preventive system, established on the bases agreed upon by *an International Sanitary Convention*, must constitute the best means that can be employed to get rid of bovine Pleuro-pneumonia, as of every other contagious malady.

* A paper prepared for the International Veterinary Congress of 1889.

In undertaking this task my object is to show, as briefly as possible, in what way such a system should be organised and brought into operation, in order to attain such a desirable result.

I. Preliminary Considerations.

The indications for the prevention of any disease being naturally deduced from the conditions and causes which determine it, I think it will be useful to recapitulate in a few words what is the *pathogenesis* of epizoötic Pleuro-pneumonia.

Like every other contagious malady, in Pleuro-pneumonia we recognise two general pathological conditions:—

1. The action of an external factor, the *virus*, the *Pleuro-pneumogeneous agent.*

2. The *receptivity*, or disposition of the organism to receive the influence of this agent.

Anything which is capable of attenuating or altering the economy may be considered as a cause of receptivity, and consequently of contagious Pleuro-pneumonia. According to the source of this micro-germ, it must be admitted that Pleuro-pneumonia, like all other contagious disorders, is developed in two principal ways—by contagion, and by spontaneous infection.

Contagion.—There is contagion when the virulent germ or *contagium* which produces the affection, is derived from a diseased animal. Science has not yet revealed anything of a precise nature with regard to the character of the Pleuro-pneumogeneous contagium, but analogy authorises the belief that this agent is an organised micro-germ, or *microbe.* What it is necessary to know, so far as the prophylaxy of the disease is concerned, is—

1. That the *contagium* is the principal cause, the only one in the majority of cases, of epizoötic Pleuro-pneumonia.

2. That the contagium exists principally in the pulmonary, pleural, dermic, hypodermic, and hepatic exudates, as well as in the bronchial secretion.

3. That it is endowed with a marked *resistance*, so that in a dry condition it may retain its virulence for six, and even nine months.

4. That *accidental contagion* generally occurs through the respiratory passages, with the air; that it may take place through the digestive organs, by the food and drink; that it may even take place through the fœtal envelopes, from the mother to the fœtus.

5. That the *transmission of the virus* is most frequently effected by *contact* and cohabitation with diseased animals; that among the latter there is a certain number in which the malady, assuming the

chronic form, may remain latent or stationary, and pass unperceived for a very long time—six months or more.

6. That transmission may also occur through *contaminated* cattle merely *soiling*, by products containing the virulent principle (foam, nasal mucus, pulmonary exudate), *places*, such as cow-sheds, pastures, water-troughs, markets; or *vehicles*, such as waggons, ships; or by *matters*, such as straw, forage, manure; or *articles*, such as head-collars, harness, curry-combs, coverings, buckets, brooms, forks, shovels, infected by the same products.

It is not established that an inoculated animal may transmit or receive Pleuro-pneumonia from other animals of the same species.

Spontaneous Infection.—I intend it to be understood that by *spontaneous infection* is implied the development of the disease by means of micro-germs which are not derived from an affected animal. These micro-germs, identical in their nature with those of the contagium, but less active, less virulent than them, may live and multiply external to the body, in certain conditions which are not yet determined. To this mode of development ought to be ascribed the appearance of Pleuro-pneumonia in those places where it had not before been observed, or where it had ceased to exist for a very long time, without our being able to invoke the intervention of germs furnished by a sick animal.

Contagion and spontaneous infection should occur the more readily when the receptivity of the organism is pronounced, and the hygienic conditions to which cattle are submitted are at fault.

Spontaneous infection, before it can be effected by means of germs less active than those of contagion, naturally demands for its production a greater receptivity than for the latter.

II. Prophylactic Measures.

The prophylaxy of Pleuro-pneumonia, like that of all microbian diseases, should conform to two general indications—ascertain the existence of the malady, and prevent its development. Hence the division of prophylactic measures into two principal categories—those which have for object the discovery of the affection, and those relating to its extermination.

1. Detective Measures.

It is an elementary principle that, in order to vanquish an enemy, it is necessary before all to ascertain where he is installed and what are his dispositions. Without this preliminary knowledge,

though we might possess the best arms possible, we will derive no benefit from them. In the present case the enemy to be sought is contagious Pleuro-pneumonia. The intrenchments of this enemy are the *diseased animals, those contaminated* (suspected of contamination), the *places, vehicles, matters,* and *infected objects.*

To arrive at a knowledge of these different intrenchments the following means may be employed: declaration, visit, obligatory inspection of cattle intended to be sold for slaughter, redhibition, notification.

1. *Declaration.*—For Pleuro-pneumonia, as for every other virulent disease, declaring its existence is the corner-stone of prophylaxy. In order that the declaration may yield all its fruit, I consider that it should not only include the affected or suspected cattle, but that it ought also to extend to every beast which has died or been killed from any cause. In the present state of affairs, the owner of a sick animal, or of one which has died or been killed, may do with it as he pleases; he may sell it to a knacker, or bury it without the police knowing anything about it. It is therefore conceivable that cases of contagious diseases, and notably epizoötic Pleuro-pneumonia, may remain unknown and escape the attention of the authorities. The obligation on the part of the owner to inform the local authority of every beast which has died or been killed because of disease, tends to obviate the serious inconvenience which the present state of things entails. There are two ways in which the desired declaration may be obtained—inflict severe penalties on those who neglect to make it, and indemnify the owners to a certain but sufficient amount to compensate them for the total loss occasioned by the prescribed sanitary measures.

2. *Visit.*—The visit which follows the declaration does not demand special attention here. Its object is to determine (1) the affected animals, suspected or contaminated; (2) the causes and conditions which have led to the evolution of the affection; (3) the places, vehicles, matters, and objects infected.

3. *The Inspection of Cattle intended for Slaughter.*—Where the inspection of cattle killed for food is not obligatory, the number of cases of Pleuro-pneumonia and other diseases which completely escape observation and are exempt from the preventive measures, must be numerous. How many owners are there who, having a sick beast, have it slaughtered for consumption, and recognising that it is attacked, or is suspected of being affected with Pleuro-pneumonia, take the greatest care to conceal the fact, and hasten to send a portion or the whole of their contaminated stock to one or more distant markets, so as to dispose of them without the

buyer being able to discover where they came from. There is only one way of preventing such an abuse—obligatory inspection of the cattle slaughtered for food.

The difficulties attending the organisation of such an inspection have been generally exaggerated. It is sufficient to see what is done is Alsace-Lorraine and the Grand Duchy of Baden, where it has now been for ten years in operation, to be convinced that nothing can be more simple and more economical in its application.

4. *Redhibition.*—This is a simple means, and one of great usefulness in certain cases, for discovering the existence of a disease. To prevent any disputes which might arise from this measure between commercial and sanitary legislation, it is sufficient, as I have already said, to harmonise things in such a way as to subordinate the latter, which is related to a particular interest, to the former, which has for its object the public interest.

5. *Information.*—When Pleuro-pneumonia or any other contagious disease is declared anywhere, it is necessary that the fact should be made known to all those who have an interest in being warned. This information may be given (1) to the inhabitants of the locality by placards or signals; (2) to the neighbouring localities by letters or circulars; (3) to all the country and to other countries, by monthly or bi-monthly bulletins.

2. Preventive Measures.

The means to stay the contagion and to prevent spontaneous infection may be divided into two principal categories—(1) those which have for their object to diminish the receptivity of the organism; (2) those which are related to the destruction of the contagium.

1. *Measures devised to give Immunity.*

There are three principal means of diminishing the receptivity of the organism for the contagium of Pleuro-pneumonia—good hygienic conditions, appropriate medication, and preventive inoculation.

1. *Hygienic Measures.*—Observation demonstrates that the proper application of hygienic laws may confer a somewhat marked natural immunity against *spontaneous infection*, and very notably prevent *contagion.*

2. *Medical Measures.*—If it is indisputable that everything which enfeebles or alters the economy promotes receptivity, it is not less certain that the intelligent administration of various tonic and antiseptic agents may so diminish it as to give the animal, if not absolute, at least very pronounced *immunity.*

3. *Inoculation.*—Clinical observation, as well as scientific ex-

perimentation, has established the fact that Willemsian inoculation invests the organism with real immunity against contagious Pleuro-pneumonia. But until there has been discovered an operative procedure which will render inoculation inoffensive, but certainly efficacious, I think it cannot usefully be employed except in the two following cases: (1) on *contaminated animals* which should not be immediately sacrificed; (2) on *non-contaminated cattle* forming part of a herd liable to frequent changes, and in which the disease has already appeared several times, as in distilleries.

2. Measures related to the Destruction of the Contagium.

After what has already been said as to the pathogenesis of the disease, the measures in connection with the destruction of the contagium may be divided into three principal classes, according as they apply (1) to the animals *affected*, or *suspected* of being infected; (2) to those *contaminated*, or suspected of contamination; (3) to the places, vehicles, matters, and infected objects.

(*a*) *Measures applicable to Diseased or Suspected Animals.*

When an animal is affected, or suspected of being affected, with contagious Pleuro-pneumonia, it ought to be killed as speedily as possible. Until this is done it ought to be carefully isolated, *i.e.*, separated from every beast to which it might communicate the disease. The Brussels Congress was unanimous in recognising the necessity of slaughtering suspected animals, as well as those really affected. Owing to this measure the function of the veterinary surgeon is rendered simple and easy. When he has before him a beast affected with acute Pleuro-pneumonia, there can be no reason for hesitation, and if he is in doubt as to whether it is a case of the contagious exudative disease or another form of Pneumonia, he may immediately require the slaughter of the beast, and by an autopsy satisfy himself as to the precise nature of the affection.

I agree with the Brussels Congress, that *in an infected place, every animal which shows symptoms of chest disease or fever of reaction* should be considered suspected. When the beast is killed the veterinary surgeon who makes the autopsy should decide if the flesh can be utilised without inconvenience, after being disinfected. When the carcase is considered unfit for use it ought to be either buried, destroyed, or transformed in such a way as to render it completely inoffensive.

(*b*) *Measures applicable to Animals Contaminated or Suspected of Contamination.*

In cases of contagious Pleuro-pneumonia, I estimate that we ought to look upon as *contaminated* (suspected of contamination)

(1) every bovine which has been in any place (byre, pasture, waggon, etc.) with a diseased one; (2) every beast which has been in a place recently occupied by a diseased one, and which is therefore infected; (3) every inoculated animal.

In the prophylaxy of contagious Pleuro-pneumonia, the part relating to contaminated animals is certainly the most important, as on the manner in which they are dealt with will depend, in my opinion, all the efficacy, I should say all the value, of the preventive system. To prevent a contaminated animal from spreading the contagion, and thus propagating the malady, is the capital point to be kept in view, and the essential object to realise if it is seriously desired to put an end to the ravages caused by this infamous but potent enemy, contagious Pleuro-pneumonia.

(*To be continued.*)

ANIMAL VACCINATION.

BY PROFESSOR FRED SMITH, M.R.C.V.S., F.I.C., ARMY VETERINARY SCHOOL, ALDERSHOT.

THE cultivation of animal lymph for the purpose of human vaccination has never in this country assumed important proportions. For this, perhaps, the medical profession is responsible, as I believe the feeling amongst its members is that human lymph gives better results, that inflamed arms are not so common, the virus keeps longer and better, and, moreover, it is generally obtainable.

The partisans of animal vaccination, or vaccination with calf lymph, deny the greater prevalence of inflamed arms, and urge as one great point in its favour the small risk incurred in producing infective diseases, and, moreover, that the lymph can be produced in any quantity desired.

I believe that our public vaccinators hold the view that it is just as safe to work with humanised as with calf lymph, they assuming, of course, that the greatest care is exercised in the choice of the vaccinifer. But in an operation which is so closely scrutinized by the eye of a distrustful public, one accident in using human lymph is sufficient to create a storm of indignation as difficult to control as it is easily roused.

Those of us who believe in animal lymph urge in its favour that such diseases as syphilis cannot be transmitted, and, besides, at a few days' notice sufficient material can be produced to protect many hundreds of people should an outbreak of Small-pox suddenly occur. The chance of infecting with tubercle appears to be a remote one, for we are told by Warlomont* that it is impos-

* "Manual of Animal Vaccination."

sible to produce Tuberculosis by the superficial insertion of the bacilli, and, moreover, that no one has been infected by making autopsies of tuberculous subjects. However that may be, and I should be the last to defend any practice possessing any actual element of danger, it is quite clear that where expense is no object, even the remote probability of producing Tuberculosis can be satisfactorily guarded against by the destruction of the vaccinifer. If a *post-mortem* examination reveals anything of a suspicious nature the whole of the lymph from this calf can at once be destroyed. Such is the system in vogue at Brussels, and I believe at other Continental establishments where the State owns and controls the production of animal lymph.

To Belgium we are chiefly indebted for the prominence which animal vaccine establishments occupy abroad; it was at Brussels where I first saw calf lymph being produced, and learned that this industry was under the control of, and in direct connection with the State Veterinary School.

In this country we have one or two small places started through private enterprise, and the National Vaccine Institution,* in London, an establishment one rarely hears of, and yet one which will well repay a careful visit; the sanitary and other arrangements are most perfect, and the whole place excellently conducted.

The military authorities, alive to the importance of thoroughly protecting all soldiers by efficient vaccination, have experienced during late years considerable trouble in obtaining the requisite amount of lymph for their purpose, and have, with considerable foresight and judgment, established at Aldershot an Army Vaccine Institute, which is entirely under the control of the Army Veterinary Department. Veterinary surgeons vaccinate the calves, collect the lymph from them, preserve it, and distribute it all over the kingdom and abroad.

The object I have in writing these few notes is to show how very simple the production of lymph is, and to stimulate our Schools and Agricultural Department to take up the subject, so as to meet the enormous demand which would arise were animal vaccination entirely practised.

I can only give a rough outline of the process, but it will be sufficient to indicate its simplicity.

The calves, about three months old, are kept under observation for a few days before vaccination, during which time the thermometer is diligently employed; no calf unless in robust health is

* It was here where I learned the details of animal vaccination, through the courtesy of Dr. Buchanan, F.R.S., and the officials of the Local Government Board engaged in this department, and to all of whom I beg to tender my best thanks for their invariable kindness and help.

vaccinated. Their food consists of hay, a little cake, roots, and grains, and they are kept warm and comfortable, the place being heated by hot-water pipes during the winter; a good clean bed is essential, otherwise the vesicles get soiled.

On the day of vaccination the animal is placed on a table of peculiar construction, so devised that he can readily be laid on his side and held firmly in position. Means are also at hand for getting rid of the excreta which are so freely produced at this time.

The calf is now shaved along the abdomen and inside both thighs, and when the skin is dry the vaccination may be commenced. Some operators prefer to inoculate by simple incisions with a blunt knife, and as many as eighty or so of these are placed on the calf; personally, I prefer to vaccinate a square about the size of a sixpence or shilling, and of these I put thirty or forty on one calf. Whichever method is employed, the same rules hold good in vaccinating, viz., not to draw blood, and not to place the vaccinated places too close together. Experience shows that the largest supply of lymph is produced by those vesicles placed on the rear part of the thigh, so that I always attend very carefully to these parts, for one vesicle in this position will produce more lymph than four on the abdomen. The lymph is worked into the slightly scarified surface, so as to ensure it taking, and the calf is let off the table, which is simply done by turning the table up (it works on hinges), and dropping the animal on the floor. The calf is now placed in a stall, I prefer a narrow one, and cradles placed on the neck to prevent him from getting at the vaccinated surface. The tail is also tied to one side. The feeding of the animal is not altered, and the temperature is taken morning and evening. About the third day it is evident that something is taking place at the seat of inoculation, and by the fifth day, or more correctly at 120 hours after vaccination, the animal is again placed on the table and the part gently washed to clear away any dirt. The vesicles now present a beautiful appearance, well raised, with a bright silver areola; the crust on the surface is adherent, and no signs of pus. The object is now to extract the lymph, but if we only took away the clear lymph one calf would not suffice for the vaccination of many people; in addition, therefore, to the lymph, we remove the solid pock tissue which contains all the virulent elements. To do this successfully, we clasp the vesicle firmly at its base with a pair of specially constructed forceps, remove the surface crust, wipe the vesicle clean, and the lymph commences to well up; this is now removed by a spatula or points, or tubes may be directly charged; with our spatula we also scrape the vesicle and so remove the tissue forming it. I prefer to remove the liquid and solid matter together, and when the calf is finished to grind the

whole up in an agate mortar, so as to get a uniform pulp; points and tubes may be directly charged from this. We generally keep three or four vesicles going at one time, and it takes about three hours to collect from one calf the whole of the lymph it will yield.

I keep the crusts from each vesicle, grind them up with a little glycerine and distilled water, and use them for vaccinating the next calf. They give most perfect results, and save the good lymph. This is the only point in the whole process which I think is my own; for the method of vaccinating by squares I am indebted to Dr. Renner, Marylebone Road, who most courteously showed me his process.

The yield of lymph per calf varies; it is generally sufficient for between 600 and 900 persons, sometimes more. I have obtained from one calf sufficient lymph for 1,500 people.

The only question which will trouble one now is the storage of the lymph. Experience shows that it does not keep well, and we do right in suspecting the virulence of any lymph more than one month old. This certainly applies to summer; in the winter its vitality is longer. In whatever way it is stored it should be protected from light and kept in a cool dry place.

The preservation of lymph is a most important matter to us, and I am instituting inquiries into the best method of preserving the virus. These results will be published when completed.

INJURY AND RUPTURE OF ŒSOPHAGUS IN A COW.

BY J. BRETT, M.R.C.V.S., MANSFIELD-WOODHOUSE, NOTTS.

THE following case is interesting from several points of view, viz., the usual cause of injury, length of time after its occurrence without any apparent deviation from health, sudden collapse after premonitory symptoms of short duration only, and the deceptive after-death appearances.

The beast in question was a well-bred, plethoric heifer, three years old, which fed and was milked on the morning of death as usual; the mid-day meal was eaten up; at 6 p.m. she refused all food, and gave very little milk; the attendant saw her again at 8.30 p.m., when she showed urgent symptoms of choking. He was at once despatched for help; she died at 9 p.m., before assistance of any kind could be got. I saw her at 10 p.m. The head was extended, foam and blood exuding from the nostrils, eyes bloodshot, protruding, and partially occluded by the membrana nictitans. The muscles of the head, neck, and sternum were emphysematous, the crepitation being most marked.

The thought flashed through my mind, Is it a death from "Quarter Ill"?

The next morning a careful *post-mortem* examination was made, with the following results: A longitudinal slit, with jagged edges, about 1½ inch long, was found towards the inferior part of the upper third of the œsophagus, and a piece of sliced turnip, about as large as the palm of the hand, was sticking in it. Following the course of the tube down the neck, small pieces of turnip about the size of horse beans were met with; these had been forced through the opening, forming a channel in contiguity with the œsophagus. This condition had evidently existed some days, as the sides of the passage were ulcerated, abscesses had formed in places, and gangrenous patches existed here and there.

An old brass brooch, with sharp cutting edges, flattened out to the size of a tumbler bottom, was found in the rumen.

PROTECTIVE INOCULATION.

BY J. A. NUNN, F.R.C.V.S., F.R.G.S., ARMY VETERINARY DEPARTMENT, ASSAM, EASTERN BENGAL.

THE subject of protective inoculation being at the present time one of interest to the general public, as a professional man one is frequently asked about the matter, and, as a rule, I have found laymen have but little idea of the theory the system is built upon; and many of them, stock-owners and others, being persons of little education and low mental capacity, are unable to follow a long explanation, and furthermore, even if they are, one has not always the time or inclination to give it. Under these circumstances I have found the following diagram useful, and it can generally be understood by any one of ordinary intelligence.

Starting from A, an animal ill from a contagious disease, if the poison or virus is taken and transferred to B, an animal or person who has not suffered from this disease, this animal or person, B, will be infected, perhaps to even a greater extent than A, so much so, indeed, that the result may be fatal. But if B recovers, for a certain time, in some cases for life, he is protected from a second attack coming from another direction. If an imaginary scale be drawn from A to C, a point is reached, either by lapse of time, disinfection, heat, or other means, at which the poison or virus loses its power; and if it is then transferred from C to $\frac{B}{2}$ it fails to produce any result. The theory of attenuation of virus or inoculation therefore is, that

between the point A, where it has its full power, and C, where it has lost it, there is an intermediate point, D, at which, if it is then transferred from D to $\frac{B}{3}$, sufficient power is retained to give the disease to B with intensity enough to protect from a second or natural attack, but yet not so virulent as to endanger life as if transferred at A, B.

"AZOTURIA;" ITS ETIOLOGY.

BY R. W. BURKE, M.R.C.V.S., A.V.D., KILKENNY.

THE disease which bears the name of Azoturia in the horse has been known for many years in England. Its pathology, however, would appear to be still in a very unsettled state, notwithstanding all that has been written upon the subject. I desire, in these few lines, to examine some of its features, and see what explanation we are able to offer with regard to the subject. I am of opinion that many factors play a part in the development of the disease, and that it may be due to one of many causes, operating variously in different cases. The teachings of physiology also say as much. It is incorrect, therefore, to lay too much stress on any one cause, and overlook all the rest, in our explanations of this disease. For neither the theory of muscle metamorphosis nor the presence of hæmoglobin in the urine will alone suffice to explain the pathology of the disease. What, then, are the conditions under which we may expect to find this disease? I will enumerate some of these only, and we shall realise the wide importance of our subject:—

Firstly. Imperfect action of the kidneys, whereby the urea of decomposed tissues and digestive materials accumulates in the blood.

Secondly. Imperfect bodily metabolism, *i.e.*, improper assimilation and improper excretion.

Thirdly. Excessive tissue-waste, following periods of rest, preceded by periods of active work.

Fourthly. Disorder of the circulation of the liver, whereby the urea manufactured in this organ is allowed to accumulate in the blood.

Fifthly. Improper grouping of food stuffs, whereby a larger supply of nitrogenous materials is taken up by the process of absorption than is required by the blood for the carrying out of the vital processes.

Sixthly. Improper action of the skin, brought on from cold and other causes impeding free circulation of the blood, which interferes with the excretory function of the skin and leads to an accu-

mulation of urea in the blood. For remember that the skin is a supplementary organ to the kidneys.

Seventhly. Sudden work following rest, which causes undue destruction of tissue, especially muscle tissue, leading to deposition of urea in the blood. Horses more often suffer from this disease following a Sunday's rest at home, where the skin has not operated freely, and less frequently in Eastern countries, where it has done so most freely at all times, aided by a high temperature and large supply of water, etc.

Eighthly. Sudden rest following regular work, whereby the substances—nitrogenous matters—derived from the food cannot be made an integral part of the tissues, as they are not required.

Ninthly. The disease is influenced by conditions of blood-pressure, and by various conditions of the nervous system.

The above are homologous causes. Whatever view we may take as to the relation between cause and effect, we must take care not to confine that relationship within too narrow a compass. So many causes operate in the body of an animal which lead to an accumulation of urea in the blood, that we may safely say that no one of those mentioned above can be regarded as more important than another. The processes of digestion, assimilation, excretion, and bodily metabolism all require our attention in studying the pathology of this disease. It is supposed to be a general derangement of all those physiological functions, which leads to an excess of urea in the blood, and to its undue presence in the urine.

The colour of the urine varies greatly in this disease, and depends on the matters present in it, chiefly urochrome and urobilin, derivatives of normal blood and found in normal urine. The source of all true pigment is the colouring matter of the blood (hæmoglobin); hence the name Hæmoglobinuria suggested for this disease by the Germans. But urine is physiologically the seat of pigment.

COMMINUTED FRACTURE OF THE LUNAR AND SIMPLE FRACTURE OF THE SCAPHOID AND CUNEIFORM BONES.

BY T. MARRIOTT, M.R.C.V.S., A.V.D., SIALKOT, INDIA.

As fracture of the above bones is of rare occurrence, the following rough notes may be sufficiently interesting for insertion in the VETERINARY JOURNAL:—

Subject.—A brown New Zealand gelding, 15.2 hands high, seven years old, the property of Major Sadlier, Queen's Bays.

History.—March 30th, 1889, the horse was in harness, and standing near the troop stables. The syce having taken the rug

off the horse, proceeded to put it under the back seat of the carriage, ready to start, when the horse finding no one near moved off at a trot, broke into a canter, and then into a gallop. After going about three hundreds yards, he was compelled to make a sharp turn. He got round the turn safely, but owing to the pace the carriage did not turn so readily, and although he tried to avoid a dry ditch—six feet wide and four deep—the conveyance simply pushed him into it, and turned, if I may use the term, a complete somersault over him. After a little trouble the horse was extricated and walked more than a mile to the Station Veterinary Hospital.

On examination I found the horse very lame on the near fore limb, the knee much swollen and painful, and although I tried for a long time to detect crepitation, the search was fruitless until 2nd April, when distinct crepitation could be heard on moving the pesiform bone.

The horse was eventually destroyed about the 15th May, and the *post-mortem* examination revealed the following fractures: Scaphoid, one triangular piece chipped off the posterior surface. Lunar, fractured in all directions into five pieces. Cuneiform, simple fracture from above to below, dividing the bone into two equal parts.

Only a very feeble attempt at union had taken place; there was an irregular deposit of ossific material upon the fractured and free surfaces of the fractured bones. The structure of the bone was normal.

The above case appears to me to be peculiar in the two following points: firstly, such a severe injury from such a trivial accident; secondly, absence of crepitation for three days when the bones were so smashed up.

REPORT ON AN OUTBREAK OF "ANTHRAX" AT MHOW, CENTRAL INDIA, AMONG THE HORSES OF THE CARABINEERS.

BY J. A. MEREDITH, A.V.D, MHOW, CENTRAL INDIA.

(*Continued from page* 174.)

Case XII.

Subject.—A grey Persian entire, aged six years. Case 550, B 23, 16th August, 1888.—Anthrax. Admitted at 11 a.m. Temperature 108, pulse 70, respirations 60; similar symptoms to others admitted, but more aggravated and acute; horse appears very ill, and was noticed first in the lines. An hour previously he showed outwardly nothing abnormal. Gave aperient pill,

Sodæ Bicarb. and Acid Carb. 10.30 p.m.—Horse no better; gave Acid Carb. 17th August, 1888, 6 a.m.—Pulse 42, temperature 106·2; no improvement; not eating; bowels not responded. 12 a.m.—Uneasy; lies down and gets up again soon; standing with his head poked out, swelling round the throat, and twitching of the ears. 18th August, 1888.—Temperature 105·4, pulse 48; discharge great from nostrils; dull; not eating; looks worse. Treatment continued with Sodæ Hyposulph. 6 p.m.—Temperature 104·4. This horse has been much the same all day; swellings of the throat and chest; discharge from nostrils continuous. 8 p.m.—Patient suddenly became restive and violent, struggling, and finally fell down and unable to rise again. 19th August, 1888, 2 a.m.—Horse much worse; swellings increased. 7 a.m.—Discharged died.

Post-mortem. — *External appearances.* — Enlargement in the pharyngeal region; skin easily detached, and upon removal the muscular tissues appeared infiltrated with yellow serosity and contained dark-coloured blood. On opening the thoracic cavity it contained a quantity of yellow fluid intermixed with blood clots, pleuræ covered with ecchymosed spots; heart soft and friable to the touch, containing a quantity of dark-coloured blood; pericardium and endocardium marked with hæmorrhagic spots; the blood vessels leading from the heart contained blood of a tarry nature; the pericardial sac contained an increased quantity of serous fluid; around the root of the lungs the tissue was infiltrated with the characteristic exudate; lungs congested, containing little or no residual air, appearing as if it had all been evacuated. The bronchi and trachea contained some frothy mucus. The thoracic and cervical lymphatics were enlarged and contained a quantity of the yellow serosity. *Stomach*, mucous membrane congested with patches of ulceration; extravasations were observed in the abdominal cavity; but this being a case of external manifestations, the intestines seemed to be less attacked, but even in this case there was a certain amount of exudate in the cavity. The *spleen* was lumpy in appearance, and the mesenteric glands were full of yellow serosity. *Liver* congested and friable. *Kidneys* soft to the touch, and the tissue round the pelvis of each was infiltrated with yellow serosity. Decomposition rapid. The mouth was full of frothy mucous of an offensive odour, and the mucous membrane before death presented a most peculiar salmon colour, which changed to dark red after death. (Bacillus Anthracis present in the blood).

Case XIII.

Subject.—A grey Persian entire, aged eight years. Case 551, B 14, 16th August, 1888—Anthrax. Admitted at 7.30 a.m. Tempera-

ture 105·2, pulse 60, respirations 38; mucous membrane very red and tinged with yellow; exhibits Colic symptoms, but shows difficulty in breathing; breath fœtid; lower lip hanging; drooping ears; distended nostrils; staring appearance, and drowsiness. Administered Magn. Sulph. 8 ozs., and at 10.30 p.m. horse showed no improvement, so gave Acid Carb. and Sodæ Bicarb.; not feeding. 17th August, 1888.—Pulse 50, temperature 103; looks much the same; eating only a little. Gave Sodæ Bicarb. 18th August, 1888.—Temperature 105, pulse 40; dull; breathing distressed; grunting; throat swollen; mucous membrane highly injected; extremities cold; eating a little grass. Sodæ Hyposulph. and Bicarb. and Acid Carb. given. 6 p.m.—Temperature 104; no improvement; swellings extending to the chest; no discharge from nostrils; treatment continued. 19th August, 1888, 10 a.m.—Temperature 102·2; throat still enlarged; appears much the same. Gave Ammon. Carb. 1 dr., Sodæ Hyposulph. 2 ozs., and ordered it to be repeated at 12 a.m. 6 p.m.—Temperature 101·3; horse much worse; swellings increasing. Gave Tinct. Aconite 20 min. 20th August, 1888.—Much worse; died at 8.15 a.m.

Post-mortem.—In this case the respiratory organs were chiefly affected; great effusion around the throat; the skin was easily removed; the effusion extending down to the chest and along the neck, the muscular tissue being stained with dark-coloured spots. The schneiderian membrane was highly tinged, and a discharge of a greenish yellow colour was present over its surface. The brain exhibited a congested appearance. The tongue and pharynx were of a peculiar lived colour; the lymphatics of the cervical region were increased in size, and contained a quantity of yellow exudate. On incising the thoracic cavity a quantity of serous fluid presented itself, the parietal and visceral pleuræ being ecchymosed. *Heart* soft and flabby, containing a quantity of dark-coloured blood, also the blood vessels proceeding from the heart; the endocardium was studded with hæmorrhagic spots; the exudate was also present round the root of the lungs, and they were congested, whilst the air tubes contained frothy mucous. The lungs presented a collapsed condition. *Digestive apparatus.*—The large veins following the intestines were full of dark-coloured blood; the peritoneum and gastro-splenic omentum were deeply stained with blood markings. *Stomach* nearly empty and the pyloric portion congested. *Liver* increased in weight, weighing 14 lbs., congested and friable. *Spleen* did not exhibit any great abnormal condition, being only a little nodulated. A quantity of exudate was present in the sub-lumbar region, and the kidneys were congested. Bladder contained urine of a treacly consistence. Blood contained the Bacillus Anthracis.

Case XIV.

Subject.—A grey Persian entire, aged six years. Case 552, B 63, 16th August, 1888—Anthrax. Admitted at 7.30 a.m. Respirations 44, temperature, 103, pulse 64, perspiration intense; mucous membrane deeply injected, almost blue; exhibits great pain and other Anthracoid symptoms. Gave Epsom Salts 8 ozs., Pulv. Zinzib. 1 dr., Hyd. Chloral 2 ozs. Horse became worse about 10 a.m., and died at 1.30 p.m.

Post-mortem.—Intestinal Anthrax.—Abdominal cavity contained a great quantity of serous fluid, in which was floating about a number of blood clots; peritoneum deeply stained with blood markings. The great omentum presented a remarkable blood-stained appearance, as did also the gastro-splenic omentum; the convolutions of the mesenteric vessels were most prominent, and full of dark-coloured blood indisposed to coagulate. *Stomach* upon incision presented quite a rare condition, being congested and having a gastric tumour situated about two inches from the pyloric opening; the tumour possessed the remarkable feature of having seven openings; in the mouth of all pus of a hard and dry nature was observed. The amount of pus in the abscess would be 10 ozs. This abscess being of some duration, did not immediately interfere with digestion; a more than usual quantity of bots were present. The small and large intestines were highly injected, the lining membrane easily removed, and had sloughed in a number of situations. The cæcum contained little food or gas. The most prominent feature was the stand out-markings of the vessels of the large colon, together with the extensive exudate thrown out with them. Charbonous tumours were present round the kidneys, and the bladder contained a quantity of dark yellow thick urine, although the catheter was freely used before death. *Rectum* everted. *Liver* weighed 13 lbs., congested and friable, with peculiar yellow stainings upon its surface. *Spleen* weighed 4½ lbs., nodulated, of the peculiar blue tinged colour; a small rupture was to be seen. The disease in this case seemed to be principally confined to the digestive apparatus, so, excepting some extravasations in the thoracic cavity, nothing greatly abnormal was to be noted. Brain and pharynx normal. The cervical lymphatic ganglia were infiltrated with the yellow exudate. The œsophagus presented its usual condition, but the mucous membrane of the mouth had a peculiar livid colour, and the tongue was protruding out of the mouth.

Case XV.

Subject.—A grey Persian gelding, aged fourteen years. Case 553, B 41, 16th August, 1888—Anthrax. Admitted at 1 p.m. *Symptoms*—

temperature 105, pulse 42, respirations 37; not feeding; dull and drowsy-looking; hanging head, with lower lip pendulent; drooping ears; nostrils dilated; mucous membrane injected; laboured breathing; extremities cold, and showing Colic pains. Gave aperient pill and Acid Carb. every three hours. 10 p.m.—Much the same; medicine repeated. 17th August, 1888, 6 a.m.—Temperature 102; pulse 30; Carb. Sodæ ½ oz. Dull, and appears to be in pain; taking little grass and water; bowels not responded. 6 p.m.—Temperature 101·4. Heavy rainfall. 18th August, 1888.—Temperature 101, pulse 44; slight swelling round the throat; no improvement; dull. 2 p.m.—Much the same, only appears more worn out. 6 p.m.—Temperature 105·1; not eating; swelling increasing; no action of the bowels; difficult breathing; grunting; patient worse. 19th August, 1888.—Gradually becoming worse. Rain continuous. Discharged died.

Post-mortem.—External Appearance.—Great œdema round the throat; muscular tissue infiltrated with yellow serosity extending down to the chest; skin easily removed from the parts; trachea contained a quantity of frothy mucous; brain congested, and effusion of blood and lymph in the ventricles; mucous membrane of the mouth stained; petechiæ on the schneiderian membrane; cervical and thoracic lymphatics enlarged and infiltrated; the thoracic cavity contained a varying quantity of exudate, in which was suspended blood clots. The pleuræ, lungs, and large vessels of the heart were of the characteristic nature, and the abdominal cavity and organs presented the usual Anthrax appearance.

Case XVI.

Subject.—A grey Persian gelding, aged six years. B 1, 16th August, 1888. Admitted at 7 a.m. Temperature 104, pulse 68, respiration 74; mucous membrane injected and yellow patches present; perspiration great; very distressed appearance, and shows other Anthrax symptoms; cannot recover. Gave Chlor. Hyd. 2 ozs. and Mag. Sulph. 8 ozs. Discharged died at 4 p.m.

Post-mortem—Intestinal Anthrax.—No external tumours, and the general *post-mortem* conditions were of a similar nature to others I have before described, a full record being retained in the record of treatment book.

Case XVII.

Subject.—A grey Persian entire, aged six years. B 2, 16th August, 1888—Anthrax. Admitted at 3 p.m. Similar symptoms to others; dull; Colic pains; pulse 46, temperature 104·2; aperient pill and Sodæ Bicarb. 10 p.m.—Much the same. 17th August, 1888, 6 a.m.—Pulse 36, temperature 104; Soda treatment continued.

6 p.m.—Temperature 103·2. 18th August, 1888, 6 a.m.—Temperature 102·2, pulse 42; looking sharper; mucous membrane injected; no swellings; breathing good; appears better; eating a little; removed him to a new ground; bowels responded. 6 p.m.—Temperature 104·1. 19th August, 1888.—Temperature at 9 a.m. 103·1; horse looks worse; no doubt the extreme wet has had some material effect; Ammon. Carb. and Hyposulph Sodæ. 6 p.m.—Worse; will not recover; Acid Carb. and Tinct. Aconite. 20th August, 1888.—Temperature 105, pulse 54; appetite quite changed. I expected patient to die last evening; treatment continued. 6 p.m.—Temperature 105, pulse 43; medicine repeated. 21st August, 1888.—Temperature 105·1, pulse 44. 6 p.m.—Temperature 106, pulse 58. 22nd August, 1888.—Temperature 103·1, pulse 48. Heavy rainfall; patient suddenly became restive and died in great agony in about two hours. Discharged died.

Post-mortem—Intestinal Anthrax.—Exhibiting the characteristic conditions of this form of Anthrax. I may mention that the appearances were intensified in this case.

Case XVIII

Subject.—Grey waler mare, aged eight years. B 65, 16th August, 1888—Anthrax. Admitted at 4 p.m. Respiration 40, temperature 104·4; breathing hard; eyes glassy; ears drooping, and general dull appearance. Gave aperient pill, and after treatment consisted in 1 dram doses of Acid Carb. 10 p.m.—Much the same. 17th August, 1888, 6 a.m.—Pulse 34, temperature 102·3; sodæ Bicarb. given. 6 p.m.—Worse; swelling in the pharyngeal region; treatment continued. 18th August, 1888.—Temperature 105·3; worse; swelling increasing; taking nothing; bowels not responded. 19th August, 1888.—Much worse; horse died at 6 p.m. Discharged died.

Post-mortem presented similar conditions to the others that exhibited external tumours.

Case XIX.

Subject.—Grey Persian entire, aged eight years. B 6, 16th August, 1888. Admitted suffering from Anthrax at 4.30 p.m. Temperature 103·3, pulse 57; dulness; drooping ears; lower lip hanging; keeps bending head and neck; mucous membrane tinged, breath fœtid, Colic pains and other usual symptoms, not any external tumours. Gave aperient pill and Sodæ Bicarb. 17th August, 1888.—Patient no better, pulse 45, temperature 103·4; eating little; treatment continued. 18th August, 1888.—Bowels responding freely to purgative. Subject is exceedingly wild, so much so

that no clinical observations could be taken, so I considered it advisable to allow him to remain quiet. Sodæ Bicarb.; treatment continued. 19th August, 1888.—Horse appears much better, eating a fair amount, and he continued to improve daily up to 8th September, when I discharged him cured.

Case XX.

Subject.—A grey Persian entire, aged nine years. B 12, 17th August, 1888—Anthrax. Admitted at 1 p.m. This horse was noticed to be somewhat sick last evening, with a temperature of 101·4; but so many horses in the troop being of this nature, I considered the case one of observation only. *Symptoms.*—Refuses food, Colic pains, and other Anthrax symptoms; temperature 104, pulse 52. Gave the ordinary Colic draught of Tinct Opii. and Spt. Æther Nit.; did not administer any aperient medicine. 18th August, 1888.—Temperature 104, pulse 35; uneasy Colic pains; gave Chlor. Hyd. 2 ozs. 2 p.m.—Much the same; no improvement; worse at 6 p.m.; cannot recover. 19th August, 1888.—Still getting worse, temperature down to 98·2. 6 p.m.—Temperature increased to 101·4; very distressed appearance; gave Sodæ Hyposulph. and Tinct. Aconite. 20th August, 1888.—Discharged died at 3 a.m.

Post-mortem.—Intestinal Anthrax in a most virulent form.

Case XXI.

Subject.—Bay Persian gelding, aged five years. F 12, 17th August, 1888—Anthrax. Admitted at 1.30 p.m. Pulse 60, temperature 107; well-defined Anthrax symptoms; gave aperient pill, followed by Acid. Carb. and Sodæ Bicarb. 6 p.m.—Temperature 107·1. 18th August, 1888, 6 a.m.—Temperature 106·4, pulse 56. 2 p.m.—Temperature 106·3, pulse 54; refuses all food; dull appearance; bowels not responded. 6 p.m.—Temperature 103·4; horse much worse; treatment continued; cannot recover. 19th August, 1888.—Discharged died at 2.30 a.m.

Post-mortem.—Intestinal Anthrax, similar appearances to the ones before described.

Case XXII.

Subject.—Grey Persian entire, aged six years. B 17, 17th August, 1888—Anthrax. This horse was admitted at 6.30 p.m. from the other horse lines. Temperature 103; swelling round the throat; dullness; refuses food; nostrils expanded; uneasy; kicking at his abdomen: distressed look; gave Sodæ Bicarb. ½ oz., Sodæ Hyposulph. 2 drs., Tinct. Aconite 20 min. in bolus. 18th August,

1888.—Temperature 103·2, pulse 44; eating grass; treatment continued every five hours. 6 p.m.—Temperature 104·3; appears much the same; eating green grass around the standing; treatment continued. 19th August, 1888.—Temperature 105; gave Ammon. Carb. 2 drs, Sodæ Hyposulph. 2 drs., repeated at 12 a.m. 6 p.m.—Temperature 104; much the same. 20th August, 1888.—Temperature 101·1, pulse 38; eating; looks much the same; Sodæ Bicarb. and Hyposulph. with Aconite. 6 p.m.—Temperature 101·1; doing well. 21st August, 1888.—Temperature 100; continues to improve; treatment continued. 6 p.m.—Temperature 102·1, pulse 46; swelling still much the same; difficulty in drinking water; eating little lucerne; treatment continued. 22nd August, 1888.—Temperature 102·1, pulse 42 at 6 a.m., improvement; treatment continued; eating; lost lot of condition; drinks more freely. 6 p.m.—Temperature 100·4, pulse 40. 23rd August, 1888.—Temperature 100, pulse 43; doing well; taking lucerne, and half-diet medicine repeated. 6 p.m.—Temperature 101·1. 24th August, 1888.—Temperature 99·3. 6 a.m.—Temperature 101·3. 6 p.m.—Medicine continued. 25th August, 1888.—Temperature 99·1; Sodæ Bicarb. only. 5.30 p.m.—Temperature 101·3. 26th August, 1888, 7.30 a.m.—Temperature 99·3. 6 p.m.—Temperature 100·2. 27th August, 1888.—Temperature 99·4, pulse normal; continues to improve. 28th August, 1888.—Temperature 100. 10th September, 1888.—Discharged cured.

Case XXIII.

Subject.—Grey Persian, aged eight years. 18th August, 1888.—Anthrax. Admitted at 6.30 a.m. Temperature 105, pulse 54; lively; eating little, but showing a number of Anthrax symptoms. Gave Sodæ Bicarb., Hyposulph., and Tinct. Aconite in bolus. 2 p.m.—Much the same, eating grass; treatment continued. 6 p.m.—Temperature 105; no improvement; medicine repeated; eating green grass from around the standing. 19th August, 1888.—Temperature 105·1; no improvement; medicine repeated every four hours. 6 p.m.—Temperature 106·1; more uneasy; strong Colic pains, swelling round the throat. 20th August, 1888.—Temperature at 6 a.m. 104·2, pulse 48; appears a trifle better; medicine continued. 6 p.m.—Temperature 104·2, pulse 49; usual condition. 21st August, 1888.—Temperature 105·2, pulse 52; no improvement; medicine continued. 6 p.m.—Temperature 104, pulse 42; treatment continued; swelling much the same, only extending down to the chest. 22nd August, 1888.—Temperature 100·3, pulse 38; swelling decreased; discharge great and green from both nostrils, steaming the head; treatment continued. 4 p.m.—

Temperature 103·4. 23rd August, 1888.—Temperature 100·3, pulse 44; doing well; treatment continued; discharge free from nostrils still, and throat much swollen; temperature 102 at 6 p.m. 24th August, 1888.—Temperature 98; doing well. 6 p.m.—Temperature 102·3. 25th August, 1888.—Temperature 99·5; Sodæ Bicarb. only; temperature 101·3, 5.30 p.m. 26th August, 1888, 7.30 a.m.—Temperature 100. 5.30 p.m.—Temperature 101·2. 27th August, 1888.—Temperature 99·3, pulse normal; no further treatment considered necessary. 28th August, 1888.—Temperature 100. 10th September, 1888.—Discharged cured.

Case XXIV.

Subject.—Bay Waler gelding, aged eight years. F 32, 18th August, 1888—Anthrax. Admitted at 7.30 a.m. Temperature 106, pulse 64; with appearance and showing unmistakable symptoms of Anthrax Fever. Gave Sodæ Bicarb., Hyposulph., and Tinct. Aconite, isolated with other F Troop horse. 2 p.m.—Temperature 106·4, pulse 44; eating grass greedily; Sodæ Hyposulph. repeated. 19th August, 1888.—Temperature 102·3, pulse 56; keeps moving head up and down; uneasy; eating still; treatment continued. 6 p.m. —Temperature 100·2; cannot recover; swelling head and throat. 20th August, 1888.—Discharged died at 7 a.m.

Post-mortem.—Anthracoid tumours around the throat and other *post-mortem* appearances; special seat of lesions, chest.

Case XXV.

Subject.—Bay Persian gelding, aged ten years. F 14, 19th August, 1888—Anthrax. Admitted at 6 a.m. Temperature 104·3, pulse 42; mucous membranes injected; refuses food. This horse stands next to F 12, one which has died of Anthrax. Gave Sodæ Bicarb. Hyposulph. 6 p.m.—Much the same; temperature 104·2; medicine repeated. 20th August, 1888.—Temperature 103·6, pulse 46; appears much the same; medicine repeated. 6 p.m.—Temperature 103·3, pulse 50; treatment continued. 21st August, 1888.—Temperature, 102·3; much the same; eating little. 6 p.m.—Temperature 105·2, pulse 60; swelling suddenly appeared round the head and throat; will not recover; sudden change for the worse. 22nd August, 1888.—Discharged died at 5.30 a.m.

Post-mortem.—Intestinal Anthrax.—Spleen weighing 9½ lbs., rough sketch of which is enclosed.

Case XXVI.

Subject.—A grey Persian entire, aged eleven years. B 61, 19th August, 1888.—Anthrax. Admitted at 1 p.m. Temperature 105,

pulse 46; dull; showing similar symptoms to the others, moving head up and down; nostrils dilated; gave Ammon. Carb. 2 drs., Sodæ Hyposulph. 2 drs., swelling round the throat. 6 p.m.—Temperature 104·3; swelling increased; Tinct. Aconite, Sodæ Hyposulph. 20th August, 1888.—Temperature 105, pulse 48; no improvement; appears much the same; gave Acid Carb., Tinct. Aconite. 6 p.m.—Temperature 105, pulse 50; no improvement; green discharge from off nostril; uneasy; Colic pains; eating little; treatment continued. 21st August, 1888.—Patient much worse; temperature 105, pulse 50; pharyngeal region much swollen; discharge from both nostrils profuse; and mixed with yellow serosity; difficulty in drinking water; medicine repeated. 6 p.m.—Temperature 105·3, pulse 56. 22nd August, 1888, 7 a.m.—Temperature 104, pulse 54; much the same. 6 p.m.—Temperature 104, pulse 52; medicine repeated three times in the day. 23rd August, 1888, 7 a.m.—Temperature 103·1, pulse 48; appears distressed, heaving at flanks; discharge continues free from both nostrils; medicine continued; difficulty in drinking; eats lucerne, but quids it. 6 p.m.—Temperature 104·1. 24th August, 1888, 7 a.m.—Temperature 101; still sore throat and difficulty in eating; quids; discharge free; steaming the head. 6 p.m.—Temperature 104; may recover. 25th August, 1888.—Temperature 101·3; doing well; Sodæ Bicarb. 6 p.m.—103. 26th August, 1888, 7.30 a.m.—Temperature 101. 6 p.m.—Temperature 102. 27th August, 1888.—Temperature 101·1; doing well; discharge ceased; loss of condition; staring coat; temperature 101·3; pulse 48 at 6 p.m. 28th August, 1888.—Temperature 101, pulse 38. 5 p.m.—Temperature 101·4; doing well; pulse 43. 29th August, 1888.—Temperature 101·1, pulse 36. 30th.—Temperature 101. 31st.—Temperature 100·4. 1st September.—99·3. 2nd September.—100·1. 3rd September.—99·3. 10th September, 1888.—Discharged cured.

Case XXVII.

Subject.—A grey Persian entire, aged eleven years. B 56, 26th August, 1888.—Anthrax.—Admitted at 6.15 p.m. Dull; refusing food; mucous membrane injected; temperature 106·1, pulse 62; blowing hard, and shows similar symptoms to the other cases. Gave Tinct. Aconite 20 min., Sodæ Bicarb. 4 drs., Hyposulph. 2 drs. in bolus. 27th August, 1888.—Appears somewhat better; no swellings; still dull; eating little lucerne; grunts and is coughing. Ball repeated at 7 a.m. and 2 p.m. 7 a.m.—Temperature 105·1, pulse 50. 6 p.m.—Temperature 106·1, pulse 58. 28th August, 1888.—Temperature 105·3, pulse 54; Pot. Nit. 2 drs.,

Gentian Pulv. 2 drs., Sodæ Hyposulph. 2 drs.; repeated at 12 a.m. 6 p.m.—Temperature 105·1, pulse 54. 29th August, 1888.—Temperature 103·3, pulse 54; medicine continued; doing well. 30th August, 1888.—Temperature 102·3; discharge slight from off nostril. 31st August, 1888.—Coughing; temperature 101·1; discharge free; medicine continued; doing well. 1st September, 1888.—Temperature 102·3; horse appears worse; medicine repeated in the afternoon; the temperature decreased again to 101·1. 3rd September, 1888.—Temperature 101·1; improvement; no further treatment considered necessary; eating regular food. 4th September, 1888.—Temperature 102·2. 5th.—101. 6 p.m. 102. 6th September.—101·1. 6 p.m. 102. 7th September.—100·4; doing well. 10th September, 1888.—Discharged cured.

Case XXVIII.

Subject.—Bay Persian gelding entire, aged twelve years. F 30, 29th August, 1888.—Anthrax. This horse was proposed for casting, and the board was ordered to assemble upon the day after the outbreak of Anthrax in the regiment. So being useless, he was isolated from F Troop, which had not exhibited any signs of Anthrax up to date, and was fed once upon the suspected grass of B Troop. Clinical observations were made on the evening of the 16th August, and nothing abnormal was detected. However, on the morning of the 17th instant he was quite unable to rise. Temperature 103·2; refusing food, and when lifted up he appeared dull and was breathing hard. The horse always before this had been a greedy feeder; he was then removed to the Anthrax camp, but some distance away from the others, so that he could not gain the contagion by being placed near the others. Clinical records were kept of his temperature as follows:—18th, 104; 19th, 103; 20th, 103·1; 21st, 103; 22nd, 102; 24th, 105·2; 25th, 104·1; 26th, 103·3; 27th, 103·1; 28th, 102·2; 6 p.m., 103; 29th, 7 a.m., 103·2; 6 p.m., 104. 30th.—Discharged died.

Post-mortem.—Similar to other cases of Intestinal Anthrax, and he had abscesses in the pelvis of both kidneys.

Remarks.—In bringing this report to a conclusion, I have to consider the following:—

Firstly.—The nature and character of the outbreak.
Secondly.—Causes or mode of access of the poison.
Thirdly.—Mortality, loss, and recoveries.
Fourthly.—Precautionary and suppressive measures.
Fifthly.—Disinfection, cremation, and disposal of dead.
Sixthly.—Breed and sex.
Lastly.—Treatment adopted.

This outbreak was characterised by the rapid manner in which it showed itself, the number of days over which it lasted, and its sudden disappearance. I have now to consider the cause of the outbreak, and seeing that Anthrax arises either from telluric influence, or from the subject coming in contact with the contagion, by means of his food or some other source, the following questions may be asked:—(*a*) Was the disease due to atmospheric influences? To this may be said "No," although a previous outbreak arose in a similar month of the year and a nearly corresponding date of the month; besides, had this been the cause, the disease would have appeared in more divided portions of the regiment, instead of being confined almost to one troop. I admit the stables in which the disease appeared were both of a nature and inferior to the iron corrugated roofed ones; but I consider the floors, walling, and other stable furniture to be equally good and clean. (*b*) Did the cause exist in the forage that had been supplied to the horses? To answer this I must necessarily sub-divide the question into groups:—(1) Was it due to the grain? No; because this supply had been a continuous one, and from a similar stock for at least a month previously, saying nothing of the fact that the same grain was issued to every horse in the regiment, and that the disease was confined to certain troops. (2) Was the supply of bran to blame? To this I cannot attribute the cause, because the issue to all the horses in the regiment was alike and drawn from a common source. (3) Can dry grass be held responsible? Certainly not; for the issue of dry grass or hay had been from one rick for quite two months previously, and had been issued to the whole regiment. (4) Was the water-supply in any way contaminated? To this one may safely say "No," seeing that B and F Troops, in which the disease appeared, each watered in company with three other troops at entirely different wells, yet the disease did not appear in any of the other troops. I have also examined the quality of the water in the wells, and find that neither are contaminated. No. 7 well contains nine grains of chlorine per gallon, whilst No. 9 well contains ·65 grains of chlorine per gallon. This places them both in the testable scale, and as such water would not be considered unfit for the use of men, so it would be safe for horses. (5) If the cause exists in none of the foregoing, is it not probable that the supply of green grass has done something to account for the outbreak? In support of this view, I beg to state that Anthrax Fever has been most prevalent of late in all the villages round cantonments, a number of cattle dying from it in each. No sanitary measures are adopted by the natives towards the disposal of the dead animals, but they are

allowed to waste and decay, and to be devoured by jackals, etc.; generally the half-dead animal is led or hauled to the nullah or river before dying, this being the only measure the native adopts to dispose of dead animals. It is a well-known fact that the regimental grass-cutter, when in search of grass, goes to all the nullahs and streams, where suddenly he comes upon a luxuriant crop and at once proceeds to make his day's work without any selection, and takes his hasty burden into camp, only to be passed together with the remainder of the supply. When the outbreak arose, I suspected the hariala from its nature and condition to be a likely cause of the disease, so at once proceeded to test my opinion, and luckily I had an excellent opportunity of proving it, thus enabling me to find out the real cause, and prevent the disease spreading, and producing considerably more damage. Troop horse F 30, which was to be cast as worn-out and useless, was selected for the experiment; clinical observations were taken on August 16th, the day of the outbreak, at 3.30 p.m., and nothing abnormal was detected; after this a fair feed of the suspected B Troop hariala was given to the subject, and he partook freely of it, with the result that on the following morning he was unable to rise—a symptom he had never previously shown. He had a greatly increased temperature, and from further reference to this case it will be seen that the horse succumbed to Anthrax Fever, accompanied by other complications, upon the 30th instant; no treatment was offered in this case, and he was entirely isolated from the others, and only had one feed of the grass. This I consider plainly proves the cause of the outbreak.

Mortality.—Twenty-eight cases of Anthrax were admitted into hospital, of which number twenty died and eight recovered. All precautionary measures, as will be seen from the report, were taken to prevent the spread of the disease, disinfection being thoroughly carried out, while special attention was bestowed upon the line gear, clothing, and syces.

Cremation.—All horses that died from Anthrax were burnt in the field cinerator with the Government allowance of fuel, which was sufficient. The ground of the field hospital has been well lined, and will now be ploughed up and allowed to remain a fallow, if possible. The stables and standings have been treated according to rules laid down in such cases.

Breed and sex.—The breed and sex of the twenty cases that died were as follows:—Persians eighteen, Australians two, entires twelve, geldings seven, mare one. The eight cases that recovered were all Persians, six of them being geldings and two entires. The percentage of recoveries is greatly in favour of the

gelding; and I noticed in almost every case the geldings withstood the disease longer than the entire.

Treatment.—The treatment adopted by me in the Anthrax cases has varied somewhat. At first I was of opinion that aperients were beneficial, seeing that as soon as the bowels responded freely some slight signs of recovery were exhibited; but unfortunately during the outbreak we had to encounter heavy rain, which must have had a detrimental effect upon some of the cases in which aperients had been administered. Magn. Sulph., Chlor. Hydrate, and Acid Carb., I tried, but with singular failure; at the same time distinct recoveries favoured me with the following treatment: Sodæ Hyposulph., Sodæ Bicarb., and Tinct. Aconite, which was given in bolus every three hours, the ordinary dose being doubled upon each occasion. I consider the Sodæ Hyposulph. treatment quite the most beneficial yet tried in Anthrax, as appreciable and most apparent results were obtained with its use. I also consider the Sodæ Bicarb. an excellent thing in combination, but both must be given in large doses when intestinal symptoms are present. I have found nothing to compare with Tinct. Aconite in double doses. I have tried Carbonate of Soda, but did not notice any good results therefrom. I found that in cases of difficult breathing, sufficient to cause the performance of tracheotomy, only temporary relief was afforded, and the patient generally died a few hours after the operation. In acute and aggravated cases there was always an inclination to feed up to the last. The horses that have recovered from Anthrax are very much reduced in condition, and they show a general unthrifty appearance, although their ration has been increased. Upon the 16th instant, B and F Troops were both returned nearer to their lines and located one upon the west and the other upon the east side of the cavalry stables; no fresh case has arisen since the 26th ultimo, excepting F 30, so I now consider the outbreak to be at an end, and the horses will be returned to their respective lines as soon as the necessary disinfections and alterations have been carried out.

Remarks.—In the foregoing report I have endeavoured to furnish as minute details of the outbreak as I consider worth recording; at the same time I must admit I could have more fully and theoretically arranged the cases, but I have taken them in as ready a manner as possible, and I trust that the report will be found, as I intend it should be, merely a rough outline of the outbreak with true records as kept up daily in the Record of Treatment Book.

Editorial.

THE INTERNATIONAL VETERINARY CONGRESS OF 1889.

The International Congress, which has been frequently announced in this Journal as arranged to be held in Paris this year, met on September 2nd, and continued its sittings until the 7th. The meetings were held at the fine and commodious rooms of the French Geographical Society, and took place morning and afternoon every day during the week, except on the 4th, which was devoted to the inauguration of the statue to the late Professor Bouley. The attendance, though considerable, was perhaps not so large as at the Congress at Brussels in 1883, owing, doubtless, to the total absence of representatives from Germany. Most of the other European countries were represented by men well known to medical and veterinary science, and to those from beyond the boundaries of France their French brethren gave a courteous reception and in most cases a hearty and hospitable welcome. The arrangements for the Congress appeared to be complete in every way, the French faculty for organisation being put strongly in evidence throughout the week. Dr. Chauveau was elected president, Nocard secretary, and the other office-bearers were selected from the members. Representatives from other countries were officially received, and Dr. Fleming, who, with Messrs. A. Robinson (Greenock) and H. Young (Brighton), attended from this country, was accepted as the representative of the profession in England.

The discussions on the various important subjects brought forward, and which will be noticed in next month's Journal, were admirably conducted, the President showing great tact and judgment in leading them to a useful conclusion, the respect and esteem in which he is universally held materially aiding in procuring this result.

One of the most interesting events of the meeting was the exhibition, by Professor Arloing, of the microbe of contagious Pleuro-pneumonia. That it is the veritable cause of the disease Arloing has absolutely proved by repeated experiments, in which he has produced the specific lung lesions by introducing it into the blood after successive cultivations. This promises to be a discovery of great value.

Another interesting event was the inauguration of the Bouley statue at the Alfort Veterinary School. This ceremony was conducted in a most impressive and brilliant manner, in the presence of a large assemblage of professional men and representatives of different branches of science. A large tribune had been erected in front of the statue, on which were seated the foreign and other Congress-men. The Minister of Agriculture honoured the ceremony with his presence, and speeches were delivered by him, by Dr. Chauveau (who received well-deserved praise for his eloquent discourse), by Nocard and Leblanc, and by Professor Degive (Brussels) on behalf of the foreign representa-

tives. The proceedings were enlivened by a military band, and by the attendance of the army veterinary surgeons in Paris and neighbourhood, *en grande tenue*. The statue is a beautiful work of art, and a striking likeness of the venerated Bouley.

On the evening of the last day of the Congress the French veterinary surgeons entertained their foreign colleagues at a banquet on the first floor of the Eiffel Tower, at which everything was said and done to testify that veterinary science is best promoted by the cultivation of sentiments of mutual respect and confraternity among its devotees.

The next Congress is to be held in Switzerland in four years.

RABIES IN SCANDINAVIA.

In the discussion which has arisen as to the desirability of adopting measures for the extinction of Rabies in the United Kingdom, the efficacy of the measures proposed by those who, it may be presumed, are in the best position to judge, has been doubted by those who are in favour of allowing things to remain as they have been and are; while the extent to which sanitary legislation in other countries has been successful, has either been ignored or misrepresented. Among other countries, Scandinavia has been mentioned as one in which suppressive measures have been most successfully employed, and by the opponents of these measures as one which is still visited by the disease. In order to settle the question, so far as that part of the world is concerned, we placed ourselves in communication with Professor Lindquist, of the Stockholm Veterinary School, and editor of the Swedish *Veterinary Journal*, who courteously writes to the following effect: "For the last ten years (1879 to 1888), the history of Rabies Canina in Sweden has been as follows:—1879. In Gothenburg one dog was affected, and in the Northern parts of Sweden (Lapland), nine dogs, one sheep, one cat, and two people were reported as attacked by it; 1880-81, no cases; 1882, three cases suspected; 1883-85, no cases; 1886, the disease appeared through a dog imported from St. Petersburgh; 1887-88, no cases. The importation of dogs from countries in which Rabies prevail is forbidden. When the disease appears in Sweden, rabid dogs and animals bitten by them are killed; and in a radius of ten kilometres from the place where the malady occurs, muzzling of all dogs is enforced for a period of 120 days after the last case. With regard to suspected animals that had bitten any person, the same regulations are carried out as are laid down in your remarkable work, 'Rabies and Hydrophobia.'"

ON THE DISEASES OF THE URINARY AND GENERATIVE ORGANS.

BY A. E. MACGILLIVRAY, M.R.C.V.S., BANFF, N.B.

(*Continued from page* 200.)

I don't think I need linger longer discussing the diseases of the generative organs in the lower animals, so I will pass on to the consideration of the various abnormalities observed in connection with the urinary system. The foundation of this system may be said to be the kidneys, and they are subject to a variety of diseases, such as Inflammation, Abscess, Tubercle, Atrophy, Hypertrophy, Calculus, etc.

Inflammation of the kidneys may be of different kinds, acute, chronic, tubercular; acute and chronic Nephritis may also be either traumatic or

idiopathic, so to speak; and as a rule the idiopathic form is the more dangerous and followed by the most serious and lingering sequelæ; it is scarcely necessary here to fully detail the symptoms of acute Nephritis, suffice it to say that it may be confounded with simple Gastralgia or even Peritonitis or Enteritis, and great care must be taken not to do so, as the treatment for these affections requires to be so very different. Nephritis is generally caused by irritation, either external or internal; the former may be the result of injury or of continued exposure to wet and cold, and the latter from faulty food or water, and even from sympathy during an attack of Peritonitis. I have also seen a very startling form of anthracoid apoplectic Nephritis, in which the kidney or kidneys were literally engorged with disintegrated blood, of a black, tarry and non-coagulable nature. Anthracoid inflammation, if the term may be allowed, of any organ is a study or problem never yet explicitly or satisfactorily worked out; it is all very good saying that a certain *bacillus* is the root and stem of this Anthrax; but how is it generally so very quickly fatal? and how does it give rise to so much extraordinary disturbance in so short a time?

Returning to our immediate subject, however, Nephritis being the disease and the character of the same having been settled, the treatment which I adopt energetically palliative and antagonistic; I remove the cause if possible, I administer sedatives and antacids, and I apply across the loins either sinapisms or sheep skins: in addition I alter and carefully regulate the diet: very heroic treatment I find obnoxious to Nephritis in general, so I never either bleed or give strong purgatives: if the latter is done in ignorance, as will happen, the effects are simply fatal.

Hypertrophy, Atrophy, or Abscess may follow Nephritis, and in either case the secretion of urine becomes abnormal; careful examination of the urine in such cases will therefore enable us to come to a decision as to what has actually taken place in the kidneys or kidney, for I have generally found only one affected during *post-mortems*.

I have very little experience of kidney *calculus;* but the reverse as regards *Tubercle*, which I have found pretty often in cattle, pigs, poultry and rabbits.

Inflammation of the *ureters* is not at all infrequent in young calves and lambs, and is almost always fatal, the ureters getting completely blocked, and thus preventing the absolutely necessary descent of the urine to the bladder; *uræmia* often closes the scene.

Having arrived at the *bladder*, we find that a great many very interesting abnormalities may be presented for consideration in connection with that important viscus. We have acute and chronic inflammation—with or without Catarrh; Atrophy and Hypertrophy—either of walls or general bulk; Paralysis—either idiopathic or sympathetic; malignant or benign tumours—usually the former; several forms of deposits and various calculi; rupture. The list might be augmented; but, as it is, an extensive treatise might be written on the subject.

Cystitis in the lower animals is more common than might at first sight be supposed, this is easily accounted for by the want of close observation and the meagre and non-restrictive character of the symptoms, which latter are analogous to those produced by tumours or calculi in that organ (bladder), and the discharges found during Urethritis and Prostatitis, or even Vaginitis. As a matter of course manual exploration will settle the doubt as to tumours and calculi; and generally the amount of mucus passed during the earlier stages of Cystitis is mostly conclusive; on the other hand we have more pain during micturition in Urethritis; and more difficulty in, if not total stoppage of, urination during Prostatitis; while examination with or without a speculum will settle the difficulty as to Vaginitis.

Cystitis may be either acute or chronic, sympathetic, traumatic, or idio-

pathic; but, of whatever character, it is almost always caused by irritation of a more or less direct nature: as a preliminary to treatment we must therefore endeavour to remove that irritation; having done so I generally give an oleaginous laxative in combination with a sedative, followed by antacids; and, if improvement is not soon observed, I adopt very mild injections of either copper or zinc sulphate and some preparation of opium: I may, however, remark that these injections must be very carefully considered and very cautiously applied; as it requires but an astonishingly small amount of irritation to do mischief in a case of Cystitis: the irritation caused by interference may bring on spasm at neck of bladder and complete retention of urine to such an extent as to cause rupture of the inflamed and tender viscus; I have seen this happen more than once.

Atrophy and Hypertrophy, as I have said, may be restricted to the walls of the bladder or to the general bulk of that organ; or the two abnormalities may be concomitant, as, for example, in two cases which I have met with (*post-mortem*) where the fundus was immensely hypertrophied—a solid thickness—while the general bulk of the rest of the bladder was reduced at least two-thirds: in both these cases during life there was incontinence—owing to injuries received by the urethra and sphincter vesicæ during erratic coition. Atrophy and Hypertrophy are commonly induced by some other cystic or urinary abnormality or injury: treatment is useless.

Vesical tumours of various sorts are by no means infrequent in the lower animals, and give rise to much irritation and serious Cystorrhœa, which may be mistaken for the catarrh often present during, or resulting from, Cystitis: microscopic examination and rectal or vaginal exploration ought to definitely settle which of the two is the origin of the "flow." As a rule the discharge from vesical tumours is far more repugnant, both in appearance and smell, than the catarrh of or from Cystitis—but exploration is most decisive for diagnosis: I have at times met very extensive cystic tumours, in young stock, which broke up and were discharged in most abominably smelling shreds; generally these cases don't do well—especially in males. It may be set down as a rule that genuine cystic tumour in the lower animals, of whatever sort, is amenable to little or no treatment, either curative or palliative; I shall not therefore further enter into the subject, as, to the veterinarian, it is only valuable diagnostically.

We will now consider the *deposits* and *calculi* found in the bladder; as a matter of course there are several sorts of deposits, and various calculi, and a correct diagnosis in regard to the same is of the utmost importance alike to the practitioner, owner, and patient. There are no doubt certain extraneous symptoms indicative of the presence of vesical deposit or calculus, but these resemble so much the symptoms present in Cystitis, Urethritis, and Prostatitis, etc., that I have always maintained the necessity and infallibility of exploration either by hand in rectum or vagina, or by sound *per urethram*, or the two in combination. Having satisfactorily settled the presence and character of the deposit or calculus, the next consideration is the removal of the same, and this, in veterinary practice, is always a very serious matter—more especially in horses.

In discussing the removal of calculi I think it will be better to embrace urethral as well as cystic, the one being as it were the sequel of the other. I have removed calculi from the mare, ox, and dog, but never from the horse. The late Professor Dick used to explain and demonstrate a very elaborate and complicated *modus operandi* for the removal of cystic calculi in the horse, which, if called upon to operate, I would never think of adopting; I would rather go in for the mode recommended by Principal Williams in his *Surgery*, namely, cutting at once boldly down into the urethra and making an incision large enough to admit the necessary size of forceps.

In the mare instead of a forceps I used a sort of double crotchet, the two arms of which met at the end of the turned round hook or crook; having introduced this *per urethram* I manipulated *per vaginam* until I got the calculus firmly lodged in the "hook or crook" of the crotchet, where I retained it in position by my right hand in the vagina, and putting considerable traction on the crotchet thus extracted the offending calculus! In one case it required two assistants on the crotchet to pull away the calculus, and yet the mare made a splendid recovery. The latter "stone" weighed close on seven ounces. The after treatment consisted of the careful application of carbolised olive oil—1 in 16—to the injured parts of and about the urethra, and, as mentioned, recovery was speedy and complete.

In the ox the calculi generally escape from the bladder into the urethra, and being very small are often very difficult to discover, but *if felt* should at once be cut down upon and removed, a proceeding which causes very little annoyance and gives immediate relief. I either stitch or pin up the wound, and in general adopt no other after treatment.

I cannot leave this part of my subject without again remarking how difficult it often is to discover the obstructing "stone" in bovines, more especially if the patient is fat. I had recently a case in a two-year-old ox where I was certain there was a calculus present *in urethram*, but failing to fix on its *locale* I did not operate. On post-mortem examination I found no less than three calculi lodged in the urethra at different places between the peculiar curvature of the bovine penis and the bladder, which viscus was ruptured. As this ox was in prime condition I advised his slaughter, but the owner would not consent.

In the dog the position of the calculus can generally be discovered by the introduction of the catheter or sound; and, as canine calculi are commonly small and their presence only suspected or known on their escape from bladder into the urethra, their removal is accomplished by cutting down into the urethra, as in cattle, which as already mentioned I have successfully accomplished. As a matter of course calculi are at times discovered in the canine bladder; but I have never operated for their removal, so I cannot discuss the subject.

Urinary deposits of all sorts owe their origin either to a faulty state of the system or to improper feeding, and the former cause may depend upon or succeed the latter. In so far as my experience goes the most dangerous form of deposit is that vulgarly known as "sand," and often it is most beautiful "lily-white sand!" Quite recently two very interesting cases of this kind in two prize-taking two-year-old oxen came under my notice; they were both very heavy animals and were both bred and brought up on the same farm, and were sold when rising two years old. Some months after their sale they were attacked at intervals with "gravelly pains," generally during urination, were treated with oleaginous purges and sedatives, which relieved them once or twice at first; but attacks becoming more frequent and more severe, examination of the urine, and the hair at point of sheath, revealed the existence of very numerous pure white crystals or "sand." On observing this I advised the slaughter of the ox under my care, and on *post-mortem* found the bladder fully half-filled with these beautiful crystals or "sand," the urethra was also nearly blocked with them along its whole course. I believe the other ox was affected in exactly the same way, and some operation was attempted for the removal of the deposit, but unfortunately proved unsuccessful.

Sabulous and other somewhat similar deposits, in bladder or other parts of urinary tract, may be got rid of by the judicious use of various acids, and diuretics, in accordance with the nature of the deposit; it is, however, impossible here to enter fully into this part of our subject.

The same remark must be made when we come to consider *the abnormalities observable in urine;* this part of our subject is of sufficient importance and interest to occupy our whole space, but must be merely glanced at. We have simple Diabetes or Polyuria, saccharine and albuminous Diabetes, Azoturia or Hæmoglobinuria, Hæmaturia, red and black water, etc. The most of these abnormalities generally originate in defective nutrition, or improper dietary; it is astonishing how easily Diabetes may be induced by an irregular, bad, and improper diet. It cannot be denied, however, that these diseased conditions of urine may be the result of other causes, such as undue exposure to cold or wet or the two combined; or may occur as the sequelæ to other debilitating affections; or may accompany or be caused by some organic lesion in some of the principal parts of the body. From whatever source they come, however, they must be pretty smartly looked after, and of one thing we may be certain, namely, that there is no "royal road" to their removal! True, there is one exception in the remarkable efficiency of *iodine* for the almost instantaneous eradication of Diabetes insipidus. In using iodine as an anti-diabetic I prefer giving one or two large doses, each containing one dram or more of pure iodine, instead of several small doses; and I believe this is generally the plan adopted.

As a preliminary to the successful treatment of any of these urinary irregularities we must find out and remove the cause, otherwise our efforts are useless. The food and water supply must be looked to, corrected, regulated, and, if necessary, completely altered. A great deal depends upon our thorough attention to these points which, if neglected, will render our prescriptions of very little avail, as the latter are merely adjuncts of the former. It is not in my power, within the bounds of this paper, to enter into the various lines of treatment necessary to contradict or remove these urinary abnormalities; suffice it to say that, in addition to the hygienic investigations and corrections we must apply various tests to the urine in order to correctly know what is actually wrong with that secretion or excretion, and, having ascertained that, we may then proceed to treat accordingly.

In Azoturia or Hæmoglobinuria I find the chief thing to be a pretty smart purgative; in the very worst cases, where the patient goes down and may be unable to rise for two or three days, I find the exhibition of from *eight* to *ten* drams of aloes all that is necessary, the animal getting on to its legs again as soon as purge operates freely.

With the tests for abnormalities in urine I need not interfere, as they are, so to speak, classical and now well known to every tyro in our profession.

In concluding this paper I may remark, as I did at the commencement, that I have strictly eschewed all routine or class-book style of writing, and stuck firmly to my own experience—given in my own words and style; for which, if found unsatisfactory or crude, I crave the kind indulgence of my readers.

INFECTIOUS MAMMITIS IN THE COW.

LUCET, veterinary surgeon at Courtenay, France, publishes an interesting article on "Infectious Mammitis in the Cow" in the *Recueil de Méd. Veterinaire* for July, which deserves notice; and especially because, as he remarks, inflammation of the mammæ in this animal, so varied and frequent, and so important with regard to lactation, tends more and more to be included among the infectious diseases. Of late years several observers, applying to study of the causes and pathology of this affection microscopical investigation, and more particularly micro-biological research, have suspected this infectious origin, and have even discovered the virulent agent in certain cases.

In 1875 Rivolta studied a Mammitis affecting goats in the neighbourhood of Pisa, and to which he gave the designation of Septic Mammitis, because of the lesions observed. About the same time L. Franck, as the result of some experiments, did not hesitate to regard as the principal, if not the sole cause of Mammitis, infection occurring through the introduction of bacteria into the udder by the canal in the teat. During ten years no further advance was made; but in 1884-5 Mollereau and Nocard studied in a complete manner a chronic Mastitis of cows which was very contagious, as it attacked nearly all the animals in a byre, and they proved by inoculation that the micro-organism found in the milk of the diseased cows was really the unique cause of the malady.

This form of Mammitis has since been observed in Switzerland by Hesse and Borgeand, of Berne; in Italy by Feletti, of Aosta; and in Denmark by Prof. Baug, of Copenhagen. In 1885 M. Mathis, in a paper on Parenchymatous Mammitis (*Journal de Medecine Veterinaire et de Zootechnie*, 1885), says: "In *resumé*, the Mammitis known to veterinarians by the name of Parenchymatous Mammitis consists not in an inflammation of the glandular acini, but rather in an inflammation of the connective tissue which separates them, and which is characterised by more particularly involving the lymphatic system. This latter consideration might lead to the view that this is an infectious malady."

In 1887 Nocard again proved by inoculation that the micrococcus found in the milk of ewes affected with Gangrenous Mammitis is really the cause of the affection.

Lastly, Kitt, of Munich, in a paper which appeared in the *Deutsche Zeitschrift fur Thiermedicin und Vergleichende Pathologie* for August, 1885, gives a very interesting description of the disorders affecting the mammæ of the domesticated animals, in which, ascribing these inflammations largely in their origin to infection, he establishes the following divisions:—

Hæmatogenous Mammitis, when the infecting agent is derived from the blood;

Galactogenous Mammitis, when it is carried by the galactophorous vessels;

Lymphogenous Mammitis, when infection is conveyed by the lymphatic vessels.

In this communication Kitt not only publishes the result of inoculation of milch cows, the virulent material having excited experimental Mammitis, but also shows that he has studied in a complete manner acute Parenchymatous Mammitis. He evidently proves, by cultures and inoculations, the parasitic nature of the malady, and, following out the idea of Franck, he admits that infection is brought about through the introduction into the gland, by means of the teat, and through the agency of drops of milk adhering to that part after milking, of various microbes derived from putrid matters (manure, putrefied fluids), and that this purulent Galactogenous Mammitis is sometimes caused by one micro-organism, sometimes by another, or even by several at once.

The observations furnished by Lucet, and which were founded on cases as they occurred in his practice, show in a remarkable way how well established this theory is. One striking fact was noted in all these cases, and that was the constant presence in the milk, or rather in the fluid drawn from the diseased gland, of a microbe, varied in character in each of the forms of Mammitis, this organism being found throughout the course of the malady.

Whether inoculation of the cow with milk or cultures had not been made, or had been unsuccessfully practised, it was nevertheless the case that in the affected part of the udder there was found a micro-organism which, if it was not specific, nevertheless determined by its presence, or by the fermentations it set up, very marked inflammatory symptoms and lesions which might cause death.

This infectious origin wonderfully explains the sudden appearance of the malady; in fact, the microbes finding in the lactiferous reservoirs of the cow a perfect culture-medium and a constant temperature, we can understand why, in a few hours—from one milking to another—occur those voluminous swellings which so terrify the cattle-owners, and which in France are generally called an Anthrax. In this way also can be explained the diversified forms which Mammitis may assume—forms which may be ranged in a certain number of groups, according to the micro-organisms which produce them, and which appear to be as varied as the lesions observed.

This origin, finally, explains why Mammitis is most frequently located in the posterior quarter of the udder, as by reason of its position it is more readily soiled by the dung during decubitus; and also affords a reason why treatment is so often of little avail in combating the disease.

Lucet describes eight cases, and from them arrives at the following conclusions:—Beyond congestion of the mammæ, always invading the whole of the organ, and which occurs some days before or after parturition, only appearing in primiparæ or very good milkers, not serious in the majority of cases, and readily yielding to antiphlogistic treatment, there is not in cattle anything other than infectious mammites, which differ in their forms and gravity according to the nature of the infecting agent; and their treatment should principally consist in injections of disinfecting fluids, passed either into the teat or into the tissue of the diseased part of the gland.

FORAGE FOR MILITARY PURPOSES.*

BY GEORGE FLEMING, C.B., LL.D., F.R.C.V.S., PRINCIPAL VETERINARY SURGEON OF THE ARMY.

I AM not aware that the subject of forage for military purposes has yet been brought before the members of this Institution for consideration and discussion; and yet it is one which, from several points of view, certainly deserves notice, especially from those who have to provide for the wants of mounted corps, whether during peace or in the field, as well as the Officers of these corps. While in quarters the subject may not seem of any moment, and particularly if the forage is abundant and of good quality; for then it is provided by the contractor in the usual manner, and, if it meets with the requirements of the contract, no further heed may be given to it. But if it is of indifferent quality, or the contractor is not moved by conscientious scruples, either as to quantity or quality, then the case is different; and only those Officers who have had long experience of forage and forage inspections know what vigilance and care are demanded in guarding against deception, and consequent injury to their horses, either from deficient quantity or improper quality.

The supply of forage in the field is always of importance, sometimes urgently so, and it is to this supply that I shall mainly allude in the brief space of time allowed me. For if it be true that the hay and corn market is not so expensive as the horse market in peace-time, then it must be accepted as still more true during war, when horses are so necessary, so difficult to replace, and when so much depends upon their being maintained in the highest state of efficiency. At all times it must be recognised that bad food makes bad horses, and insufficient food produces weakly ones; and while at any time bad or weakly horses are undesirable, on active service they are most objectionable in every way.

* A lecture delivered at the Royal United Service Institution, Lt.-General Sir Beauchamp Walker, K.C.B., in the chair.

In considering the subject of forage for military purposes, I purpose, with your permission, to deal with it under the following heads, and chiefly with a view to the requirements of field service: 1st, Different kinds of forage; 2nd, Concentrated; 3rd, Compressed forage.

1. *Different kinds of Forage.*—The usual food of horses in this country, and over the greater part of Europe, is oats and hay, with sometimes a certain proportion of straw. In some parts of Spain, as well as in North Africa and Asia Minor, the grain given is usually barley, with chopped or broken straw. In South Africa and America, maize is largely used, with hay and straw. In India, gram and cooltee are the principal grains, and freshly gathered grass is chiefly used instead of hay and straw.

For the present we will consider oats, hay, and straw as constituting the classical forage rations of army horses in Europe; other articles being substituted only in special circumstances, when the supply of these is too expensive, inadequate, or altogether fails. It must be remarked, however, in speaking of these substitutes, and especially with regard to grain, that they can rarely be resorted to suddenly. The horse appears to be peculiarly impressionable to abrupt changes from one kind of food to another—more so, perhaps, than any other of the domesticated animals; and this must be seriously taken into account in considering the question of forage for army use. This impressionability is related not only to the horse's physiological constitution, but also to his natural fastidiousness and delicacy of taste. He requires a long time to become reconciled to some kinds of food, no matter how suited they may be to his organization; and when a strange forage is put before a number of horses, it is curious to note the different ways in which individuals will take to it. Some will eat it without hesitation, others after a day or two, others will eat it sparingly and never take to it kindly; while some others, again, will not even try it, and will sink from hunger exhaustion with the food lying before them.

Physiologically, sudden changes from one forage to another are often productive of very serious consequences, and many instances of grave damage to troop horses from this cause might be mentioned. I need, however, only allude to the great mortality which occurred among the horses of our mounted corps, immediately after the Battle of Waterloo, when the Allied Armies were advancing on Paris, due to the horses being fed chiefly on growing wheat, for lack of other forage; and to the heavy damage done to our army horses in the Crimea, when they were given barley instead of oats, the supply of the latter having failed. Injury of this kind is more or less related to the digestibility of the food, a matter of importance in regard to this subject.

In Oats we have, undoubtedly, the best of all the grain foods for horses, as they contain, in a concentrated form, all the elements necessary for supplying waste of tissue, and especially that of the muscles; while they are, as a rule, easily digested. For horses performing hard work, there is no grain equal to them, though it must be admitted that horses can undergo severe exertion on other kinds of grain, such as barley and maize.

The nutritive value of oats is about equal to that of hay, though owing to their more ready digestibility and relatively small bulk, they are preferable to it when time, transport, and capacity are of moment. And besides their value as an aliment, it would appear that oats contain that which has not yet been found in any grain food given to horses, in the form of a stimulating principle which, acting upon the nervous system of horses, gives them more energy and stamina while developing their muscular powers, and has altogether a favourable influence on their condition when they are taxed by work. M. Sanson has discovered this principle in the husk, and having isolated it, has experimented with it upon horses. To this may be attributed the superiority of oats over barley, maize, and other grain, in sustaining

horses for long periods of severe exertion, when stimulation, as well as pabulum, is needed.

In judging of oats for food, it is well to remember the characters by which good may be differentiated from bad oats. In the first place, each grain consists of two parts, husk and kernel, the latter possessing considerable alimentary value, and the former scarcely any at all; so that oats which contain the largest proportion of kernel are those which are most serviceable to the horse. The relative proportions of kernel and husk vary considerably in different kinds of oats; in some samples the husk forms as much as 35 and 40 per cent. of the oats, while in good grain it may be as low as 20 per cent. It is of importance sometimes to estimate the feeding value of oats, and this can readily be done by separating the kernel from the husk by hand in a number of seeds, and weighing each. This gives a better and a more practical indication than is afforded by the external appearance of the oats, their colour, or their weight collectively. It may be noted that oats which have the smallest proportion of husk are those which are most readily and thoroughly digested, and that crushed oats are more quickly and perfectly digested than when they are whole.

The weight of oats is not altogether a trustworthy index to their nutritive value, though it is that which is generally adopted; the thickness of husk and its separation from the kernel, as well as the dryness of the grain, will influence its density. M. Grandeau compared many samples of oats, and found a rather wide diversity between them, with regard to their natural weight and nutritive value. Thus, in different samples of oats, all weighing 57 kilogrammes to the hectolitre (125½ lbs. to 2¾ bushels), he ascertained that the nitrogenous matter was 8·19, 8·71, 9·74, 9·50, and 10·42 per cent., demonstrating that there is not a fixed relation between the richness in the useful elements in oats, and their density or weight.

It is also to be observed that the oats grown in various countries differ much in quality, in nutritive value, and in digestibility.

There can scarcely be a doubt that the contract weight (38 lbs.) per bushel of oats for army horses is too low, and especially when we know that they are chiefly obtained from Sweden and Russia, where the quality of this grain, and particularly the Swedish, is rather inferior. At least 40 lbs. to the bushel should be made the minimum standard; and it is needless to add that they should possess all the characters of sound and clean oats. Musty oats are particularly dangerous, and instances are innumerable of the damage done to horses by feeding them on such grain. One notable instance is recorded of such injury being inflicted on troop horses, in the case of the 12th Lancers. That regiment formed part of the British Army which occupied France for three years after the Battle of Waterloo, and the horses were fed chiefly on oats which had become heated and musty in the stores where they had been collected in large quantities.

Other kinds of grain food are sometimes substituted, wholly or partially, for oats, according to circumstances, but, as I have said, they cannot be recognised as equal to them. Maize approaches them closely, and forms the chief, often the only grain food of horses in several parts of the world. In South Africa our troop horses have been fed upon it and performed good service; and during the French expedition to Mexico the horses and mules sent from France received no other grain, and did well upon it. In the United States of America and in Mexico, it is the staple food of working horses, and in Europe it is now largely used, being even grown in some parts. General Rosenberg introduced it into the ration of the horses in the Prussian Army some years ago; and in Spain, Portugal, Italy, Hungary, and the Rhine Provinces, it has long been recognised as well adapted for horses performing hard work. It is very digestible and economical, and may replace

one-third, two-thirds, or even the entire ration of oats, weight for weight, if the seeds are broken previously. In South Africa the maize is given in stalk to the horses, these stalks and heads being known as "mealies."

Barley, as already mentioned, is rarely used in this country as food for horses; in France and Italy it is only given in the South. In the East it is almost the only grain allowed, not so much perhaps because it is preferred to oats, as because these cannot be grown in warm countries. In Spain, barley and chopped straw constitute the only forage, and the horses thrive well on it. In 1823, when the French Army entered that country, the cavalry and artillery horses soon became accustomed to it, and no ill effects were observed.

Rye is not a desirable food for army horses, and the same may be said of wheat. Millet is sometimes given to horses, especially in Southern Russia, where it grows abundantly; and, as jawaree, it is used for the same purpose in some parts of India and in North China. It is said that the Belooch mares in the Western Punjab receive scarcely any other grain, and they perform the severest marches on it.

Bran enters more or less into the ration of troop horses, especially on shipboard, where it is very useful. In the infirmary stables for sick horses it is most valuable. The chief drawback to its use in the field hitherto, has been its great bulk, inflammability, and tendency to become sour and mouldy in a short time, if exposed to damp. All this is entirely obviated by compressing it into large dense cakes, which are almost weather and fire-proof, contain a great quantity in a small bulk, and are easily transported.

Of the pulses, the most important is undoubtedly Beans, which should form a portion of the grain ration of all horses performing very long and severe labour, as they are a very stimulating and nourishing food. But beans require careful inspection, as they are so often unsound and infested by parasites. They should be split or cracked before they are given to horses.

Peas rarely enter into the ration of the troop horse in Europe, probably because of their being rather indigestible; though Gram, a kind of pea, is largely employed in India.

Other grains are sometimes given to horses, but so seldom as not to merit consideration here.

The different grasses furnish a very large proportion of the food of horses, and are more or less valuable according to their botanical order and condition. They are described as natural and artificial; the natural ones being true grasses, and the artificial not so, as they contain the clovers, lucern, sanfoin, and others of a like character, and which are rarely given to army horses.

The natural grasses are those best adapted for horses performing fast work, as they are less bulky and more easily digested. They are not given in the green state in Europe, unless occasionally in small quantity, as they contain too much water, and are unsuitable for working horses. When properly dried, however, in the form of Hay, they constitute an essential portion of the daily ration, and one-third of their weight in this state is more than equivalent in nutritive value to the full allowance in the green or undried condition. Hay varies considerably in feeding value, according to not only the grasses which enter into its composition, but also according to the situation, the soil, the districts, and even the countries in which it is grown; and also to the manner in which it is preserved or made.

It would be out of place here to describe the different kinds of hay and the characteristics of good hay, as they should be familiar to all who have to do with the provisioning or feeding of horses.

Suffice it to state, that hay should always be of recognised good quality,

both of growth and preservation. It is the natural food upon which horses can live all the year round without any grain, so long as they are not doing any or much work; as it maintains the temperature and the vital functions when no unusual demand is made upon these. But to supply the waste of the body caused by work, an abnormal quantity of hay would have to be consumed, and this would prove injurious. On the other hand, horses cannot live on grain alone. Experiments have demonstrated that after a week or ten days' feeding on good oats only, they gradually eat less, become dull and heavy, lose weight and condition, and are evidently sick of the too stimulating and concentrated food.

Much discussion has arisen as to whether it is best to give the hay long or cut. When given uncut there is no doubt that much of it is wasted, and a considerable time is consumed in masticating it. Persons who employ a large number of horses, find it more economical to have the hay chopped and mixed with the grain; and for army horses, and especially when on picket lines, chopped hay would prove a great boon, as the loss in the daily allowance is considerable, particularly if the weather be wet or windy. But the difficulty in obtaining it prepared in this way during peace-time is an obstacle, and in the field it could not well be fed to the horses unless a different kind of feeding or nose-bag were provided.

I shall recur to this point, however, in a few minutes; merely remarking that the bulkiness of hay, and especially if it be long, is a great drawback to its use on active service. It requires much transport, is easily damaged by wet, is very inflammable, and is troublesome to issue. It is a terrible encumbrance to the cavalry soldier when it has to be carried loose in the regulation hay-net. I know of nothing which can prove more worrying and hampering to cavalry in a charge, in passing through a thickly wooded or scrub-covered country, or in crossing streams or rivers, or even in wet weather, than hay-nets distended with hay. These should be abolished.

With regard to straw I have but little to say, as it does not enter into the food ration of our army horses, and is only allowed as litter. Though horses are sometimes partial to it, yet it contains very little nutriment, and it is too bulky and indigestible for horses performing hard or fast work. A small proportion, if sweet and chopped, gives bulk to the feed, and causes the horse to masticate his oats. For this purpose oat straw is preferable to any other. The difficulty attending the transport of straw prohibits its use in the field, where it certainly can be dispensed with.

2. *Special Forage.*—At various times attempts have been made to feed horses upon specially prepared foods, with the view of presenting nutriment in a concentrated and more readily assimilable form, and also, for armies, with a view to portability in addition.

In books on the training of horses published during the last century, directions are given for the production of what was called "horse bread," and during this century experiments have been numerous with various kinds of artificial and specially prepared foods for horses, more particularly for those employed during war.

I have already remarked that horses are extremely dainty in their food, and even in the matter of grass and grain to which they are unaccustomed, they will often prefer starvation to eating it. To animal food, especially, they have a particular objection, and the slightest trace of it in their ordinary forage will sometimes cause them to reject it. Their sense of smell is more acute than that of taste, though that is also highly developed. Yet, notwithstanding this delicacy of taste, horses will in time get over their prejudices, and eat what is otherwise very foreign to their nature and habits. In Iceland, for instance, the horses have no scruples at all in eating fish.

Not long ago, M. Müntz introduced a forage biscuit, composed of blood

and crushed oats and maize. The mixture was kneaded, cut up into cakes, and cooked in an oven or simply dried in a stove. When fresh they had an agreeable odour, and it is reported that horses ate them with avidity. If such food could be introduced, from its high nutritive standard it should, to a certain extent, advantageously take the place of ordinary forage, as the slaughter-houses could furnish a large supply of blood. But several conditions would have to be observed: the blood must be perfectly fresh and healthy, the biscuits should be well dried or baked, and they must be kept from damp. Otherwise, putrefaction must rapidly ensue.

During the investment of Metz by the Germans in 1870, attempts were made in the French Army to feed a certain number of horses on the flesh of those which had died or been killed. Veterinary-Surgeon Laguerrière, who made the experiments, reports that:—

1. The flesh of any animal can be used as food for horses.

2. The repugnance of horses for flesh is not nearly so great as is generally believed; for by proper preparation of the flesh, and by diminishing the ordinary ration, or even withholding it altogether at one or two feeding times, horses rapidly become accustomed to it.

3. Horses digest perfectly raw or cooked flesh, even more quickly and completely than they digest vegetable substances.

4. On flesh, horses thrive, fatten, and increase in vigour and energy, if it be given in addition to the daily ration, or even if it largely takes the place of the usual forage.

5. Raw flesh may be given to a certain number of horses, but it is preferable to boil it well; the water in which it has been boiled may be given them to drink.

6. Whether raw or boiled, the flesh should be finely cut up or hashed, then triturated and mixed with vegetable substances more or less alimentary, as leaves of trees, straw, hay, meal, grains, roots, etc., and, if possible, common salt added.

7. The flesh should be given in small quantities at first, gradually increasing the allowance. As much as 4½ to 6½ lbs. per diem have been given to each horse, flesh being then almost exclusively the daily food.

8. Certain horses readily took the mixture from the hand, others ate it from the nosebag, while others again preferred it from the ground or in the manger.

9. Several horses ate the morsels of raw flesh with only bran, meal, or grains sprinkled over them, or ate them when placed between leaves; afterwards these animals took them without any preparation whatever.

10. If the horses absolutely refuse this animal food, it is easy to overcome their repugnance by drying the cooked flesh, reducing it to a powder, and making it into a bread prepared with any vegetable substance.

More recently, and with a view to feeding army horses on active service with a highly nutritious food in small bulk, Scheurer-Kestner introduced a meat biscuit, in which the inferior flesh of cattle was utilised. When made with oatmeal, or barley, or maize-meal, to which one-third of flesh was added, the fermentation during baking dissolved the latter, and thus the vegetable ingredients were endowed with great reparative properties. This biscuit was reported as capable of being kept for several years without being damaged.

In England a similar biscuit has been tried with reported success by a Mr. Dunkelberg; and Spratt's dog biscuit, which contains a certain proportion of flesh, has been given to horses, which were said to eat it readily. It is stated that the desert Arabs have for a long time been accustomed to give their horses a meat biscuit or bread on certain occasions, when great exertion is required from them. Not long ago an experiment was made with a kind of bread or biscuit composed of crushed oats and the refuse of flesh left from the pre-

paration of Liebig's extract of meat; with this the horses of a cavalry regiment stationed at Deutz, Germany, were fed for some time, and the result was so satisfactory that the German Minister for War had a large quantity made at Mayence for a more extensive trial.

Bread or biscuit, composed entirely of vegetable matter, has been used for a long time in Sweden, Germany, Belgium, and Holland, and has often been tried in this country. Its use for army horses has frequently been put to a serious and extensive test. Owing to the difficulties attending the transport of forage in the field, the subject had for many years attracted the attention of military nations; but it was not until the Franco-German War of 1870-1, that attempts were made to decide the question of its utility. During that momentous event, it was found that, notwithstanding the good organisation of the German Intendance, the supply of forage, even in such a country as France—so full of resources of every kind, and with such ready facilities for moving them from one part to another—was often interrupted and precarious, especially for the cavalry. This was mainly owing to the new fashion introduced of employing that arm in widely scattered and far advanced detachments, to screen the advance of the slower moving troops, to act as scouts, and to keep touch with the enemy, instead of marching in masses close to their supplies, which were carried by the transport.

And even after the campaign was terminated, the difficulty was still present to the troops left to occupy the French provinces. There was very little forage of any kind left in the zone of territory occupied by them, and it was not an easy task to transport it from the neighbouring provinces. It was indeed with the greatest effort that a permanent supply of hay was procured for the horses of the Headquarter Staff. The German Treasury, moreover, suffered great losses in oats, partly on account of constant damage and deterioration to which this kind of forage is liable in transport, and partly also on account of the very high price that had to be given for this grain when supplies had to be purchased for the army.

So urgent did the matter appear to the military authorities, that the Commander-in-Chief of the army of occupation, Field-Marshal Manteuffel, and Intendant of the Army, Herr Englehardt, were, in 1872, induced to appoint a Special Commission to make trials of various sorts of condensed forage, prepared by Herr Warnecke, in a large and most complete laboratory established by the German Government at Nancy for the supply of preserved provisions for the troops. This compressed forage took the form of biscuits (*Pferde kuchen*), prepared with the meal of various grains in certain proportions. There were three kinds of biscuit, designated as 1, 2, and 3. They were composed as follows:—

	Per cent.
No. 1.	
Oatmeal	30
Rye-meal	30
Ground linseed	10
No. 2.	
Oatmeal	40
Dextrinated pea-flour	40
Ground linseed	20
No. 3.	
Dextrinated pea-flour	20
Wheaten flour	20
Ground Indian corn	20
Rye-meal	20
Bread-waste	10
Ground linseed	10

A small proportion of salt was added.

The ration of biscuit varied, but it was estimated that about 4 lbs. were equivalent to 11 lbs of oats, and that 6 lbs. per diem would enable a horse to undergo extraordinary fatigue, even if not supplemented by any other forage. Each biscuit was four inches in diameter, and the 4 lb. ration occupied a space that width, by fifteen inches in length. They were either strung on a wire or carried in a canvas bag for conveyance on the saddle, and when given to the horse were broken in pieces, and eaten either dry or after being soaked in water.

The trials of these biscuits were begun by the cavalry of the German Army of occupation in 1872, on an extensive scale, and prolonged for ten months without interruption. One hundred horses were experimented upon on each occasion for ten days; fifty were fed with hay and oats as usual, the other fifty being fed solely on the biscuits, which had been manufactured a year. The result of these trials was reported as most satisfactory, inasmuch as the horses fed with the biscuits were, during the whole period, full of vigour and spirit; and while the trial lasted the average number of sick horses was seventy-five per cent. less than with those foraged in the usual way. A large Committee of Officers, among whom were the chief veterinary surgeons, decided in 1873 that these forage biscuits were excellent, and that they answered the requirements perfectly. Such distinguished chemists as Liebig and Fresenius also gave their opinion in favour of this concentrated forage, and asserted that it entirely fulfilled all necessary conditions.

Other trials were made with this biscuit, and in the end the results were deemed so satisfactory and so conclusive, that it was decided to build, with the remains of the war indemnity placed at the disposal of General Manteuffel, three factories for making them (and also preserved rations for the soldiers), at Mainz, Berlin, and Ratisbon, and on such a scale that in the event of war they could manufacture many thousands of rations daily of this forage; at Mainz 19,000 rations could be made per day.

The success of these experiments in the German Army induced the Russian military authorities to institute trials of forage biscuit in some of the Guards cavalry corps, and also in the cavalry of the Odessa and some other commands. Those in the Guards cavalry were carried out on the same principle as those in the German cavalry. A certain number of horses were selected, and for the first twenty-five days they received 4 lbs. biscuit and 10 lbs. hay. Then $\frac{3}{8}$ lb. biscuit was added, and 2 lbs. less hay allowed until the thirtieth day, when the horses received nothing but 6 lbs. biscuit per diem for several days. At the termination of this trial, the vigour and general condition of the animals was found to be equal to that of the horses fed on the ordinary ration. The experiments in the other corps were equally satisfactory, and the consequence was that the Russian Government followed the example of the German Government, and in 1877 established a biscuit factory at St. Petersburg, at Moscow, and at Ekaterinoslaw. That at St. Petersburg can turn out nearly two tons of biscuit a day. The composition of the Russian biscuit was, in 1879, as follows:

		Per cent.
Oatmeal	from	35 to 40
Rye-meal	„	25 „ 30
Pea-meal	„	15 „ 20
Linseed-meal	„	9 „ 10
Common salt	„	1½ „ —

During the Russo-Turkish War, when no fewer than 20,000,000 rations of this biscuit were consumed in the Russian Army, its composition was:—

		Per cent.
Oatmeal	from	30 to 40
Pea-meal	„	30 „ 50

Barley-meal.....	from	10 to 20
Linseed-meal	„	15 „ 20
Common salt	„	1 „ 5

The factory at St. Petersburg, during the war, furnished 20,000 rations daily, and had at the end of September, 1887, despatched more than 500,000 rations for the use of the active army.

Each biscuit was 3½ inches in diameter and ¾ inch thick. They were strung on a wire or string, which passed through a hole in their middle, and by it were attached to the saddle. During the passage of the Balkans and the subsequent advance into the neighbourhood of Constantinople, all the horses of the cavalry and artillery of the Russian Guard were fed entirely upon the biscuit for twenty-six days, and are reported to have kept in excellent condition all the time, although hard worked and exposed to inclement weather. The only disadvantage found in their use, was that the soldiers stole them to eat. The Germans prevented this by adding five per cent. lupine seed. A horse could carry from two to five days' rations, and the biscuits were given either wet or dry, but always broken; the horses were fed on them three times a-day, at 7 a.m., noon, and at 7 p.m.

The German biscuit was tried in the Austrian Army, but the result was unfavourable.

France has, on several occasions, made trials of forage biscuits, notably those proposed by Army Veterinary Surgeon Naudin and M. Barthe. These biscuits were tried in France in 1878, and with the cavalry in Tunisia more recently; but the results do not appear to have been sufficiently satisfactory to induce the French Government to adopt this kind of forage.

The Italian Government, in 1878, instituted experiments at Salerno, with a similar biscuit introduced by Colonel Ravelli, the experiments being carried out on cavalry horses, sixty-four in number, for a month. Thirty-two of these were fed on the biscuit only, sixteen on it and hay, and sixteen on it and oats. The first received nearly 11 lbs. of biscuit per diem, the second 3¼ lbs., and the third 3 lbs. 2 ozs. The last two consumed, in addition, the first, 11 lbs. of hay, their usual ration; the other 7 lbs., their oat ration. In the early days of the experiment, the precaution was taken to soften the biscuits in water, so that they might be more easily eaten by the horses. Some did not take to it well, and two or three of the Maremma breed absolutely refused it. In the third, fourth, and fifth days, some of the horses fed on the damped biscuits only, showed signs of gastric disturbance; when fed on dry biscuit they all recovered. Those on the mixed food, with two or three exceptions, did not show any signs of indigestion during the month, and preserved their vigour; though they looked rather empty, as did the others. The conclusion was favourable to the use of biscuits, and it was recommended that in camp and during war the ration should be increased to 13·2 lbs., and also that they should be given to the horses during peace, in order to accustom them to this food.

The great importance of the subject of quality and transport of forage has not escaped the attention of our own Government, but, on the contrary, has received much notice from it since the Russian War of 1854-55. For the war in North China in 1860, and also for that in New Zealand in 1863, and in Abyssinia in 1867, compressed hay mixed with oats was sent as forage, and was reported upon as a great improvement on the ordinary forage, though objectionable in some respects; for instance, waste of grain in issuing the forage, and the drawback in having the hay and oats together when only one of them was wanted, as well as the defect that one could not be increased without also increasing the other.

(*To be continued.*)

PRELIMINARY REPORT OF THE BOARD APPOINTED TO MAKE FULL INQUIRY INTO THE ORIGIN AND NATURE OF A PREVALENT DISEASE AFFECTING STOCK, COMMONLY KNOWN AS "MANGE," IN QUEENSLAND.

(*Continued from page* 186.)

The title, then, to the designation "mange" as a true definition of the disease under investigation would seem to rest on the discovery at Ipswich by Dr. Lightoller of a single specimen regarded by Mr. Pottie as "closely resembling the *Sarcoptis.*" It is doubtless this insect which gave rise to the following telegraphic communication in the *Brisbane Courier*, 15th March, 1888:—"The insect to which the disease known as Queensland mange is due, is said by an expert who has examined specimens to belong to the Acari family, and is closely allied to the insect which produces scab in sheep." The means of measuring the degree of affinity of the species of acarus represented by this celebrated specimen to the two species above named is not available, but it may ıbe safely inferred, however, that it is neither of them. Is it not an example of an acarus commonly met with in collections of the scurf made from animals suffering from the disease? and, therefore, nothing more than a species of *Tyroglyphus*, a mite which feeds on dead animal matter, just as another species of the same genus lives at the expense of our cheeses. This is an acarus which can only be detected with the naked eye when it comes between it and the source of light, so small are its dimensions. As far as investigations have been conducted, no scab or mange insect has been detected, neither on the under surface of pieces of attached dead cuticle which have been removed in quest of them, nor beneath veritable scabs existing as secondary consequences of the presence of the disease. We have, therefore, no hesitation in stating that the affection under investigation is not a variety of mange.*

Others have suggested that the exciting cause of the disease may exist in the presence of some insect which alights on the horse, and then inflicts injury upon it. Thus Mr. W. H. Caldwell, of Pialba, in a letter dated 27th February, writes: "I beg to inform you that in this district the horses are attacked by a minute insect with pure white wings, which immediately on alighting upon the animal make their way under the hair," and "it is certain that a beast after being attacked by these insects will rub itself against fences, trees, or anything at hand." A son of Mr. Joseph Sellars, of Rosevale, narrated a similar observation to that related in the former of the two preceding statements. The insects are said by some to be about only at peep of day. However, the members of Board, on examination of a mob of diseased horses at this time, did not see any evidence of the existence of this insect, except such as was afforded by the presence of a small beetle, which alighted

* This misnomer, too, has doubtless also arisen from writers, even of repute in veterinary science, having under the heading "mange" treated of a disease which, from their description, cannot be it. Thus Mayhew, in his "Horse Doctor," relates of a disease, which is no doubt the one being now investigated here, that "it first appears as a dry scurf amongst the hairs of the mane, extending to all parts except (very rarely) the legs; great itching, hair falls off, and the vacant places look as if they had been burned by quicklime. Further, the skin thickens and is corrugated with folds. A few hairs remain, very hard to pull out, and when pulled out are found to be enlarged or bulbous at the root; and upon examining the raw places small pimples are seen [? the papillæ of the cutis.—H. T.], which burst (?) and form an itching scab. It is stated to be quite impossible to forebode an attack of mange. The horse rubbing himself against posts, and showing delight when he is scratched under the mane are the only signs of its presence."—(Quoted in *Queensland Times*, Ipswich, 10th March, 1888.)

on one of the horses. A larger beetle, which was stated to have alighted upon a horse's back, and to have at once commenced to dig its way into the hair, proved on examination to be a species of Adorium. It is improbable, however, that any insect, unless occurring in such numbers as to be very conspicuous by its presence, could cause such an extent of disease, much less one of such nature, as the one under investigation is described to be. Notwithstanding, the very first symptom mentioned does certainly simulate the injury caused by the sting or bite of an insect.*

Having now disposed of the different theories as to the cause and nature of the disease, it remains to point out that the true exciting cause of this affection resides in the fungus sporules present in such innumerable numbers. These living organisms having invaded the more superficial cells of the cuticle,

* Since this report has been written, specimens of minute dipterous insects, and probably identical with these referred to by W. H. Caldwell, of Pialba, were brought to me by Mr. J. P. S. Pinwill, Ranger for Crown Lands in the East Morton District. Mr. Pinwill, from his own observations at Oxley, had concluded that the small flies which he handed to me alighted on cattle and entered amongst the hair, and as soon as they had found the skin filled themselves with blood. They then crawled up the hair and flew away. He had not remarked their presence on mangey horses or cattle, but was of opinion, although without experience as to this being so, that the disease would follow the attacks of these insects. These minute flies belong to the *Psychodidæ*, and seem to be referable also to the typical genus of that family, *Psychoda*. This genus comprises small flies with broad, very short, oval whitish wings, which like the body are very hairy. They may be seen flying and leaping on the banks of, or on the surface of pools, and on windows. The larvæ feed on dung (Packard). These little insects are very familiar objects, and might be very commonly observed on dirty windows, certainly in Brisbane, ever since 1881, during many months of the year. Residents at Oxley state that they have been noticed for years past and that they commonly congregate on cows, usually during the evening and morning, and especially at such times as they are brought into sheltered places to be milked. That they also bite the cattle is most probable in view of the fact that their mouth organs are suitable for such a performance, and also since the habit has already been observed in the family *Psychodidæ*. According to Schiner (*Reise der Novara, Diptera*, pp. 28, 29), a genus of *Psychodidæ* has been named, independently, *Phlebotomus* by Rondani, and *Hæmasson* by Loew, doubtless, as now appears, in allusion to this trait, the existence of which seems to have been perceived by these investigators. Unfortunately the works of the two specialists mentioned cannot be consulted, so that it is incompetent to state whether the Queensland insect is a *Phlebotomus* or not. The family is a small one, though universally distributed, and contains about thirty species. Australia has not hitherto been credited with a representative of it, but New Zealand has the *Psychoda conspicillata*, Hutton. Formerly these insects were included in the gall-fly family, *Cecidomyidæ*, with which, from an anatomical point of view, they have much in common. Did these species of *Psychoda* give rise to the disease under investigation this might be expected to occur more generally over the surface of the body, and the initial lesions would be met with much more densely than is known to be the case. Also, it might be anticipated that in other countries, where these flies exist, they would too have been found in them also to be causally related to this or to some allied disease. This is not the case. In the absence of any condition or conditions which with sufficient reason might be regarded as the true cause of the disease, these flies then might possibly be considered as fulfilling this office; but when an efficient cause is made out there does not seem to be sufficient evidence to admit of its being dismissed in their favour. Whether they actually occasion lesions in the skin, and whether these serve as favourable situations for the operation of the true cause of the disease, cannot at present be decided, nor is this probable from the facts known concerning the associated occurrence of insect stings or bites, and skin diseases generally. In fact, is there more evidence to connect, in the way suggested, these *Psychodidæ* with the present affection in stock than there is to attribute a similar relation to the familiar mosquito?

and the inner sheath of the hair bulb, and so having passed within the hair itself, live at the expense of the material on which the persistence of the vitality of these portions of the tissue depends. Accordingly these cells of the cuticle and hair die, and although they are discarded by desquamation and shedding of hair, this action only slowly takes place, and accordingly there is always a mass of dead material existing on the surface, which thus irritates the true skin and causes, as is very evident, intense itching.*

In fact, the disease is nothing more than what in veterinary works is designated "Parasitic Ringworm," and thus one which is not peculiar to the colony. Mr. Fleming mentions several instances quoted by authorities of the occurrence of *Tinea tonsurans*, or Ringworm, on horses (*vide Veterinarian*, May, 1872). Mr. G. Armitage, M.R.C.V.S., in "Every Man his own Cattle Doctor," London, 3rd edition, p. 570, writes of it under the heading "Ringworm," and quotes Professor Gerlach, of the Veterinary School of Berlin, as follows:—

"The squamous crust is about two or three lines in height, and has a greyish white, fibrous appearance. At first the crusts are very firmly adherent to the skin, and if detached from it leave a bleeding surface; they afterwards become less so, and ultimately fall, leaving patches of hair" (*sic*). "The eruption commences by little circumscribed points about the size of a pea, which increase peripherally, and thus gradually form the scaly crusts, which generally fall off from six to twelve weeks after the first appearance. On examining the crusts with the microscope, long chains of quadrangular sporules are observed. There are also a large number of round isolated cells.

"The parasite (*Trichophytes tonsurans*) is formed in the hair follicles. In well-developed crusts a layer of sporules surround each hair, while in less perfect ones some hairs are quite free from them."†

Similarly, J. R. Dobson, in "The Ox and his Diseases," pp. 233-4, and other veterinary writers, refer to Ringworm as a disease of horses and cattle.

* The constant presence of the minute organisms in connection with the disease, even as soon as the primary lesion can be recognised, as well as the condition of those portions of the tissue in which it exists, supports the view that in reference to it they are pathogenic or producers of the disease, even if it were not known that when similar bodies occur in analogous skin affections they are regarded as undoubted causes of these diseases. This remark is called forth in anticipation of the objection that they are saprophytic—*i.e.*, plants feeding on dead animal matter. Notwithstanding, it is evident that for the establishment of this relation as a scientific fact, it is necessary to be able when given the parasite to produce the disease. Further still, in order to ascertain whether this given disease is due to this special organism, the following procedure must be adopted:—"In the first place, the pathologist does ascertain whether an organism, and which organism, is present in the diseased tissues. In a variety of ways he studies the characters of such an organism by fresh examination, by methods of staining with various dyes, and by cultures. By this latter method he not only studies their behaviour in various culture media, but at the same time isolates the organism in order to obtain pure cultivations. Having then obtained unmistakeably pure cultivations, he proceeds to inoculate suitable animals with them, and ascertains whether this purified organism is capable of again producing the same disease from which it had been originally derived. And further, in this so induced disease, the same organism must again be detected; by morphological study, and by the method of culture, it must become clear that in his new infection we meet with exactly the same organism as in the original disease."—E. Klein: "Bacteriological Research," *Journ. Chem. Soc.*, 1886, p. 197.

† Though allowance be made for some misrepresentation of the facts actually recorded by Professor Gerlach, owing to the imperfect rendering of the German idiom, it is evident that the variety of Ringworm—the subject of his remarks—though allied to, is not identical with the Queensland disease.

See especially Fleming's "Manual of Veterinary Sanitary Science and Police," vol. ii., pp., 464-471.*

The most noteworthy and pertinent reference to this subject is, however, contained in the following quotation:—"A very instructive history of an epidemic of *Tinea tonsurans*, or, as it was called, *Epizootic herpes*, occurring a few years since amongst some 300 mules and horses in the Valley of Borne, in Savoy, is given by Professor Papa, who was instructed to investigate the circumstances connected with the epidemic. A number of instances are recorded in which the disease was communicated direct from horse to man, man to man, man to wife, and wife to infant. The disease attacked the horses and mules about the head, the neck, withers, shoulders, and loins. It was itchy, and at first thought to be due to *acari*, but its real nature soon became apparent. In the cases observed by Professor Papa, the communicated disease in the non-hairy parts of the men was an exaggeration, so to speak, of ordinary so-called *Herpes circinatus*, or properly *Tinea circinata*, as in the cases which have just come under my observation, though this peculiarity was not pointed out by the Professor.† The patches of disease were, I notice, said to be studded over here and there with small pustular points, (This is also sometimes so in the cases of the present disease.—H. T.) indicative, as before observed, of a more than usual amount of irritant, and produced by a plentiful sowing of the fungus elements upon the skin."—Tilbury Fox, *op. cit.*, p. 455.

It should be borne in mind that the disease under investigation during no stage of its development, except at the very onset when minute ones are formed, develops true scabs. They do, however, occur as the result of secondary changes. But there is so much vagueness implied in the designation given to the elementary lesions of skin diseases by people generally,

* In a brief article on "Vegetable Parasitic Skin Diseases," by Richard W. Burke, M.R.C.V.S., A.V.D., etc. (*The Veterinarian*, vol. lxi., No. 722, p. 78, London, Febr., 1888), the following maladies of this class are alluded to viz.:—(1) *Herpes tonsurans*, (2) *Favus*, and (3) *Impetigo contagiosa*. The author states that "it is not known positively whether even these two [*i.e.* (1) and (2)] are actually caused by a fungus or by tissue change." Notwithstanding, without further comment, he proceeds to state that Mégnin has met with two species of *Trichophyton* "attacking animals": (*a*) one accompanying a disease "resembling *Herpes circinatus*, which he finds to be due to a new species of *Trichophyton*," and the other (*b*), the above *Herpes tonsurans*. Mr. R. W. Burke also is evidently of opinion that (*a*)—*i.e.*, Mégnin's *Tinea epilans*—is one of those he himself first mentions. By way of further contradiction he adds:—"Besides the above three skin diseases *due to vegetable parasitic action* there are others described in which a fungus has been found." Two such, then, he in conclusion refers to. His No. 1 is otherwise known as *Epizootic herpes*, and more correctly *Tinea tonsurans*.

† Since the above quotation has been transcribed, an interesting fact bearing on the relation between two forms of *Tinea* has come under observation. A chestnut mare belonging to Mr. E. J. Armstrong, of Milton, was reported as having both "Ringworm" and "Mange," the latter recently developed. On examination of this animal, the writer found one solitary and nine adjacent spots on the hind quarter; these were all quite separate. They were nearly circular, and each about the size of a shilling, and somewhat raised above the general level of the surface of the body. The hair on these was being shed, and that which still remained on the neighbouring healthy skin above extended over these spots, which it covered except in the case of their lower borders. Hence a *circinate* appearance was produced. The "Mange" disease presented the ordinary characters. Hair and epidermis which were removed from the areas involved in the two diseased conditions were in both cases similarly affected, and under the microscope exhibited the presence of a fungus, that from one source not to be distinguished from that from the other. It was supposed that this mare had contracted the "Mange" from a badly and earlier affected black mare stabled during the day in an adjacent stall.

that by the term "scab" may be meant squamæ or scales—or dead portions of cuticle still adherent.

Predisposing Condition.—It would appear that there is no diathesis or predisposing condition favourable to the occurrence of the disease. Both old and young horses or stock take it. An instance of a foal, from four to six months of age, affected by the disease occurring at Wilson's Plains, Harrisville, has been brought under notice. Young stock, however, often escape. Stock in good as well as bad condition are also subject to it, neither does breeding seem to have any influence either in determining its invasion, or withstanding it. Animals constantly "worked," as well as such as do little, are alike attacked.

Origin and Dissemination.—The occurrence of the disease being due to the presence of minute vegetable parasites within the cells of the cuticle proper and its appendages, which, by disturbing the local nutrition of these parts, so occasion their death; there can be no doubt that the primary condition on which the origin of this disease depends is access to the body of such portions of these microscopical fungi as are capable of development. And, as this can be readily brought about, there can be no doubt that this disease, like all other parasitic diseases, may be regarded as contagious. Writing of the closely related Ringworm of human beings (*Tinea tonsurans*), Dr. Tilbury Fox states that when once introduced, this disease is spread in several ways, and that one of these depends on the fact that the air under some circumstances "is loaded with the germs of the fungus *Trichophyton tonsurans*," which are capable alone of giving rise to it. He adds also: "I am particularly anxious to call special attention to the last point. When I came to collect the dust deposited from the air in the wards of the institution in which the outbreak of Ringworm before referred to occurred, I found that it contained fungus elements in abundance;" also that "epithelial scales were found in the dust,"* which, as there represented (figs. 71 and 72), were infested with fungus sporules.

The contagious nature of the present disease is borne out by facts in abundance. Amongst numerous other instances which might be quoted in support of this conclusion, Mr. P. Cannan, of Mt. Walker, stated that he had one horse affected with "Mange" last year, and eight this, and that the mare which retained the disease all the winter (of 1887) through, developed it with fresh virulence during the spring of this season. And, indeed, it is a general experience that on runs or farms where this skin affection occurred last season it has shown itself with increased virulence this; not only in the particular class of animals in which it first manifested itself, but also in cattle. The same witness states that his cattle running with the horses had never the disease previous to this season.

Mr. William Allen, M.L.A., who introduced the deputation which waited on the Colonial Secretary in reference to the subject, is reported to have made the following remarks in his address: "There are stations between Yeulbah and St. George that were last year quite uninfected. Two of Cobb and Co.'s coach horses, however, have become diseased, and the horses along that line that came in contact with them are now suffering. At the Millungera Station there were over a thousand horses with not a sign of the disease amongst them until a traveller came along with two horses which were affected with it, and then the disease went through the whole lot." That the spores of the specific fungus which always accompanies the disease exist in abundance in the dusty and furfaceous matter which infest the hair of an

* "Skin Diseases," p. 443. See also the very important article "Découverte des spores de l'Achorion dans l'air qui entoure les malades atteints de *favus*." Extract of a note by M. J. Lemaire, *Comptes Rendus*, T. 59, pp. 127-8, Paris, 1864, which is instructive, although this disease is not *Favus*.

affected animal, and are being continuously shed by it, is a matter of easy demonstration. Also, that horses and stock generally, when affected with it, are constantly rubbing against one another; the unsound often against those which are perfectly healthy. In a similar way different parts of stables and yards may become indirect sources of infection. But further still, there can be no doubt that the air passing over an infected beast receives a charge of fungus spores; especially seeing that, when subject to the irritating presence of the disease, the animal is constantly quivering its skin by the aid of the special muscles with which it is endowed for this purpose.

However, there is still another condition which determines the origin of the disease, and this consists in the occurrence of certain circumstances essential for the development of the fungus, or, at least, a special pathogenetic property in it. That this is so is an undoubted fact, and is tacitly assumed every day when affected animals are not segregated and isolated, and still there does not arise further cases of the disease in previously healthy animals than when this is done. It explains the experience already on more than one occasion brought under the notice of the Board, that saddles are transferred from so-called "mangey horses" on to sound ones, and *vice versa*, ever and anon, without the latter being invariably infected by the disease; also, that mares which have the disease exceptionally only prove sources of infection for foals which are running at their feet. In fact it disposes of all the negative evidence which may be adduced to militate against the view regarding the disease as an essentially contagious one. Were no such check opposed to the dissemination of the disease, there can be no doubt that, owing to the well-nigh infinite number of fungus sporules developed by a single infected animal, and their extreme minuteness which enables them to form, as it were, motes in the sunbeam, and especially under the conditions under which stock are depastured in the Colonies, no immunity from the disease could be even hoped for. But the checks are doubtless very formidable ones; it is these that have prevented isolated cases of so-called "Infectious Ringworm," which is no new skin affection in European countries, from spreading the disease on every side. It is the suspension of the operations of these checks which has given rise to this epidemic which has existed in Queensland these few seasons past, and to similar ones which have previously arisen in other countries. Dr. Tilbury Fox refers, as we have previously seen, to such an epidemic of *Tinea tonsurans* or Ringworm "occurring a few years since amongst some 300 mules and horses in the valley of Borne, in Savoy," an instructive history of which, as he informs us, has been written by Professor Papa, on whom devolved the duties of investigating the circumstances connected with it.

The nature of these checks are at present unknown, or rather the circumstances favouring the virulent development of the Ringworm fungus; but it goes without saying that an original source of the disease must, at some time or other, have occurred in the existence of some animal or animals—feral or domestic—in which the disease occurred, with the seeds of which the stock of the Colony must have been brought in contact. Yet it must be borne in mind that the spores constituting these seeds may have remained for a considerable time with their manifestation of vitality suspended, or may even have been propagated in media other than those afforded by the tissues of animals subject to contagious Ringworm. These events are highly probable in view of the discoveries made in the recent science of bacteriology, and the latter event especially so, seeing that the particular spores of the fungus occasioning the disease under investigation may be cultivated in such a medium as glycerine and water. We can only surmise what the checks may be; epidemics of this disease rarely occur, so that we may reasonably suppose that they reside in the ordinary circumstances of the life of stock. The favouring circumstance for the development of the pathogenetic virulence of

the fungus may be occasioned by the arising of some nice relation between atmospheric humidity and temperature, for bacteriologists have taught us that whilst the special pabulum on which microscopic fungi will live is variable, the use of the warm and moist chamber is necessary in order to produce conditions favouring their development; so that after all there may be some truth in the statement that "the disease in question may be the result of heat and wet," but not that it "is not contagious," though in the absence of these favouring conditions the contagious feature may cease to be manifested.*

Treatment.—The treatment to be employed is indicated by the nature and origin of the disease. The most expedient measures to be adopted await the decisions of the Board, to be arrived at as the outcome of systematic experiments carried out, as is here recommended, under their direction. Meanwhile, the general nature of the course to be availed of may profitably be considered. The special method of procedure will of necessity depend on the class and quality of the stock to be dealt with, and the conditions under which the animals are reared and maintained. Obviously, too, these same considerations will decide whether measures, the adoption of which necessitates much monetary outlay, can profitably be employed; but whatever method shall be decided upon as being the best for use, it must be borne in mind that it must be repeated with sufficient frequency—that is, as often as it may be inferred that the agents have ceased to exert any influence, or have been removed by evaporation or rain. For instance, the absence of the characteristic odour of carbolic acid is an indication for the renewed use of the application containing it. Nor must the fact be lost sight of that we have in this disease one that is very difficult to stamp out, and one which it is not likely will vanish, after an animal has been treated once only.

Preventive Measures.—It cannot at present be definitely laid down what these should consist in. In a closely-related disease in the human subject, cleansing the hair and then greasing and oiling it is recommended. This plan, then, might in certain cases be profitably carried out, at least as far as the oiling is concerned.

Eradication.—Treatment with this object in view must be directed towards getting rid of the vegetable parasite, the cause of the affection, or at least indefinitely checking its further development. Its exact nature can only be pronounced with certainty when the effects of agents on pure cultivations of the organism causally related to the disease have been experimentally demonstrated. It may be remarked at the outset, that, as the hair of the body is periodically shed (as is not the case with that of the mane and tail), no direct harm can result from removing it, at least by mechanical means, to the extent of the affected areas. Its removal will eventually occur in the course of the disease, and such a procedure, as a preliminary measure, will serve to admit the full operation of whatever parasiticide it is decided to employ. Failing this—and there are many reasons that conspire to render such a course inexpedient—it is desirable that the affected parts should be early washed by means of a stiff brush and plenty of soap, preferably soft soap. As, too, it is essential that the agents used should reach to the full depth of the hair bulbs, it is necessary that they should be suspended or dissolved in some easily penetrating medium, and that neither it nor they be readily dissipated by evaporation. Emulsions, soaps and ointments, therefore, are preferable

* In seeking for the source of the present epidemic, I am reminded of the occurrence, frequent in Queensland, of Ringworm about the eyes and face generally of calves, and although a superficial observer may discard the notion that this disease and the so-called Mange have anything in common, I am not of this opinion, bearing in mind the genetic connection between the different forms of *tinea* disease, manifesting outwardly such distinct characters, in human beings.

to tinctures or infusions; vaseline and glycerine, as menstrua, to simple fatty substances. Amongst disinfectants or destroyers of vegetable organisms there are certain chemicals which contain as parts of their constitutions acids of (1) chlorine, iodine and bromine; (2) boron, and (3) sulphur; also certain compounds belonging to the carbon series, such as carbolic acid or phenol, the creasotes, salicylic acid, and tobacco.

(*To be continued.*)

THE BALTIMORE VETERINARY COLLEGE.

IF progress in Veterinary Science is to be estimated by the number of schools inaugurated to cultivate and teach it, then surely its advancement must be rapid in these latter years, and in no part of the world is this so remarkably evidenced as in the United States of America. Very soon we may expect to see each State provided with one or more Veterinary Schools, and when that happens it may then be found that what is occurring in this country will be manifest on the American Continent, the supply of graduates will greatly exceed the demand.

The directors of the Baltimore University, impressed with the value of what they term the "Veterinary Art," have organised a Veterinary School, and secured what appears to be a very competent staff, in which we find R. Ward, F.R.C.V.S., assuming a very prominent position as a teacher, while installed as President of the Faculty. The school will open to-day (October 1st), and students must be of good moral character, possess a fair education in English, and have a knowledge of Latin. The course of instruction terminates on March 15th next, when an examination will be held, when those students who pass will be eligible to enter the second year's course; at the end of this there will be another examination, those who successfully undergo it being eligible to go up for the final test, upon passing which they will receive the diploma of Doctor of Veterinary Science.

Under the auspices of the Baltimore University this school makes a good start, and we feel sure, from personal knowledge, that our esteemed and energetic colleague, Professor Ward, will do his utmost to make it a success.

Proceedings of Veterinary Medical Societies, &c.

LINCOLNSHIRE VETERINARY MEDICAL ASSOCIATION.

A MEETING of the above Association was held at the "Red Lion" Hotel, Boston, on August 15th. There was a good attendance of members, including Messrs. B. Freer (Uppingham), President; F. L. Gooch (Stamford), Hon. Secretary; T. Greaves (Manchester), W. H. Brooks (Fulbeck), W. G. B. Dickenson (Boston), J. W. Gresswell (Peterborough), C. Hartley (Lincoln), J. Mackinder (Peterborough), T. J. Marriott (Bottesford), G. Osborne (Fulstow), T. A. Rudkin (Grantham), and Captain B. H. Russell (Grantham). Mr. L. Mitchell, M.R.C.V.S, was present as a visitor.

The PRESIDENT, (B. Freer, Esq., M.R.C.V.S.), at once proceeded to deliver his inaugural address, as follows:—

GENTLEMEN,—I must first thank you very heartily for placing me in this proud position, and although I feel and know that the duties attached are somewhat onerous, I can assure you that it will be always my earnest endeavour to fulfil them to the utmost of my ability, and to do all that lies in my power to further the interests of this Society. I venture to hope that

you will support me by attending the meetings, and by freely joining in the discussions on the subjects which will be brought before you.

This Association is now in its seventh year, and although its growth is but slow, I believe it is sure, and thanks to our excellent Treasurer and Secretary, a substantial balance now stands to our credit. I, for one, should like to see our meetings better attended. The places of meeting are carefully selected, are comparatively easy of access, and many excellent subjects have been brought forward, and have provoked profitable discussion. This is the second largest county in England, and living in it there are something like seventy members of the profession. If more would join us, and I am sure no one will ever regret having done so, we ought soon to take our place as one of the foremost societies in the land.

Our profession, during the last decade, has made very rapid strides, and although the penal clause has not at present brought about all those glorious advantages we were led to expect, let us hope there is a good time coming. We are certainly in a very different position, socially and otherwise, from that of our fathers forty years ago. Our literature has received many valuable additions, notably the works of Dr. Fleming, Professor Williams, and the late Professor Robertson, each and all of which are of great value to the practitioner. Last year saw the production of a very valuable quarterly work, the *Journal of Comparative Pathology*, and almost at the same time a much-needed, instructive, and occasionally humorous weekly pamphlet, the *Veterinary Record*. I am sure Mr. Hunting deserves well of us all, and I hope he will be well supported by the profession, not only pecuniarily, although that is a most important point in these matter-of-fact days, but by members of the profession contributing cases of interest, and also by freely ventilating their opinions on matters specially pertaining to the profession. We cannot learn too much, and is it not often more easy to learn by reading and thinking over short and instructive articles, or by listening to and actively taking part in discussions at such meetings as these, than by poring for hours over some ponderous book? Our Pharmacopœia has received numerous, and in some instances valuable additions, but as "all is not gold that glitters," many of these have not the all-powerful virtues ascribed to them. How different is much of our treatment from that of our predecessors fifty years ago! Theirs is pretty well summed up in the epitaph to a Dr. Isaac Letsom—

> "I bleeds, I physics, and I sweats 'em,
> And if they dies—why, then
> I. Letsom."

Their treatment, especially in bleeding, was no doubt very heroic, but I think that many of us are apt to err too much in the opposite direction. Who is there here who, after perhaps an hour or two spent in fruitless endeavours to relieve a horse suffering with spasmodic Colic, after withdrawing four or five quarts of blood, has not had the pleasure of seeing the animal relieved and looking about his box for food? Or, mayhap his patient has been a plethoric cart-horse blowing like a steam-engine and dead lame on one leg; has not a rapid blood-letting literally cut short the attack? The administration of alkaloids and other powerful drugs by the hypodermic, intravenous, or intratrachial methods has done away with many difficulties we formerly had to contend with.

In Tetanus, violent Colic, irritative Fever, and many other diseases these methods of administration are especially useful. Surgery as applied to our profession has made even greater strides than medicine. Certain regions of the equine or bovine body, the surgical interference with which a very few years since would have been considered madness, are now simply play-boxes for

the skilled operator. Who could have thought twenty years ago of puncturing the abdomen of the horse with a trocar and canula? But when done soon enough and, if necessary, often enough, it is a very valuable operation. The removal of tumours has been much simplified by the addition to our stock of instruments of the ecraseur, and surgical interference with the teeth, although requiring strength and patience, has been rendered much easier by the invention of powerful and useful shears and forceps. But the crowning operation, as far as surgery goes, is the one known as laryngotomy, an operation which has given rise to the dissemination of more angry words than any of its predecessors. Whether the operation will bestow upon the equine race all the advantages claimed for it remains to be seen. I, for one, sincerely and heartily hope that it will. I had, with many others, the pleasure of seeing Professor Axe operate on three horses at Wolverhampton, and could not help admiring the dexterous manner in which he completed each operation. Whatever may be its ultimate result, it has very strongly called our attention to the advantages of chloroform. Every one here has no doubt used this drug often and often, and has no doubt as often been disappointed with its results, *i.e.*, when administered with a large admixture of air; but now that we are practically sure that a strong horse can be anæsthetised in less than four minutes, with, at the outside, three ounces of methylated chloroform, I think we ought in all important operations to use it. I believe over a hundred horses have been placed under its influence at Woolwich without any danger, and in my small way I have, since March, chloroformed sixteen horses, with satisfaction to myself and to my employers.

There is one other question, gentlemen, which I wish briefly to bring before your notice. In looking down the lists of new members that are biennially pitchforked into the profession, have you never asked yourselves what is to become of them all? Many, no doubt, have been working hard for their diplomas, and are anxiously looking forward to the time when they will be able to take some of the duties off the shoulders of a hard-worked parent; and many others there are whose ambition is to join the army; others again, will away to distant lands—the United States and Canada, Australia, and other of our colonies have work in plenty for the skilled veterinarian, whilst the Argentine Republic and other South American States, seeing the enormous quantity of high-priced horses and cattle they are continually purchasing in this country, appear to offer great inducements to young men of experience and energy. The fact remains that we must be getting overcrowded. Veterinary surgeons in large towns bitterly complain of overcompetition and cutting down of prices, whilst we poor long-suffering practitioners in the country know how different it is now from what it was twenty years ago. Horses suffering from Colic are treated by their owners to two or three bottles of gaseous fluid or ethereal elixir, and their abdomens rubbed with Elliman's embrocation. Sore throats are stimulated with somebody's patent vesicant, and the hot mash is rendered doubly nauseous by the addition of some one else's powders. Splints, Spavins, and Ringbones are attacked with ossidine, or ossiline, or some other *ine*, whilst certain cures are flying about for all sorts of diseases. The treatment of sheep and lambs, particularly for tapeworm and Strangles, used in days gone by to make a considerable difference in the yearly returns; but it is quite a different thing now. Veterinary surgeons advertise in the local papers their lung specifics and anti-filarial mixtures; druggists send out certain cures, either of their own make or made up from some agricultural paper or other; whilst one or two sheep-dipping manufacturers not only bargain to cure Scab and kill ticks and lice, but guarantee to drive out tapeworm and cure Bronchitis in either lambs or calves with the same stuff. Wholesale druggists, in my opinion, are not doing much good to those who have been numbered amongst their best cus-

tomers; their pamphlets can be seen in many places besides the pharmacy of the Veterinary Surgeon, stating not only the prices of their balls and powders, but also giving the formulæ from which they are prepared. In fact, gentlemen, taking one consideration with another, our life, like that of the policeman, is not a happy one. What will it be ten years hence? The survival of the fittest. The weak will go to the wall, and although in this address I am not going to attempt any solution of the difficulty, one thing is certain, and that is the vet. of the future, if he means to follow the profession as a means of livelihood, must undergo a special training; must, besides the knowledge he possesses from books, be thoroughly grounded in the rudiments of his calling; must be able when he starts in practice to perform all ordinary operations with ease and dexterity; in short, must go about his patient as if he understood all about it. To ensure this the youth who thinks of entering the profession should spend a year or more, before going to college, with a gentleman in good practice, who in less than half that time would be able to tell the young man himself or his parents whether he looked like making a vet., or whether he would not be more at home behind the counter. I think it very unwise to send a youth straight to college without giving him the chance of finding out whether he is fitted or not for the profession he wishes to enter, and several men, to my knowledge, after passing their examinations with ease, have turned out miserable failures as country practitioners — one in particular, a college friend of my own, well educated but with no knowledge of domestic animals, who after passing his examinations went off in high glee to a remote part of England and started in practice. Clients flocked to him for a time, but as his want of practical knowledge and utter unsuitability in other respects became evident, they gradually left him. His want of success preyed on his mind, and in less than five years after obtaining his diploma he died in a lunatic asylum. I thank you all very sincerely for your kind attention, and I hope as each meeting comes round and the inevitable parting again takes place we may each and all feel that we have added something more to our store of knowledge.

The President's address was very warmly received, and he was asked to submit his paper for publication.

The minutes of the last meeting having been confirmed, the SECRETARY (Mr. F. L. Gooch) then read letters of explanation and apology for non-attendance from various members.

On the proposition of the PRESIDENT (Mr. B. Freer), seconded by the SECRETARY (Mr. F. L. Gooch), Mr. Tom Holmes, of Bourn, was elected a member of the Society.

On the motion of Mr. HARTLEY (Lincoln), seconded by Mr. MARRIOTT (Bottesford), Lincoln was chosen as the next place of meeting.

Various communications were brought next before the Society by the Secretary, some being of a semi-private character.

A letter from Mr. KIDD was read, asking for the attendance of a deputation from the Society at a conference to take into consideration the possibility of fixing the dates for Association meetings, so that meetings could not clash by being held at the same time.

The SECRETARY remarked that he had written to Mr. Kidd and told him the matter should be brought before the Society, and the result be made known to him. He (Mr. Gooch) had written to the President for his opinion, and Mr. Freer replied that he would be pleased to attend a conference, together with the Secretary, at some future date, but as he had not heard further from Mr. Kidd, he supposed the date of the conference had not been fixed.

Captain RUSSELL thought it was quite unnecessary for the conference to be attended. The matter might be very well left to the Associations them-

selves. They could best judge when the meetings might conveniently be held. It was not necessary to put the President and Secretary to the expense of attending the Conference, but if it was necessary that the Conference should be attended he would propose that the expenses be paid by the Society.

The PRESIDENT pointed out that they had not found it convenient to adhere to the rules as to the time of meeting. If they had held a meeting in June it would have clashed with the Royal Show at Windsor, and they naturally concluded that some members would like to go to the show. They thought, therefore, that it was best to postpone the meeting. In July the meeting would have clashed with the National Veterinary meeting in London. He did not see, in face of these alterations, how it was possible for a conference to fix any particular date for meetings. There were lots of things in a county like Lincolnshire that might crop up, of more importance than their meetings, to which they might wish to go. If they fixed a certain week, and the Lincolnshire Show was held that week, they would not get anybody at the meeting at all. The better plan was to leave the President and Secretary to fix the date of the meeting as soon as possible after the time appointed.

After some further talk, Captain RUSSELL gave notice of an alteration of Rule 5, namely, that the words "On the last Thursday" be omitted, and that an addition be made, "That it be in the power of the President and Secretary to name the date of the meeting, after taking into consideration the various meetings of other Associations."

INSPECTION OF MEAT.

A letter was read suggesting that the Government be memorialised to inquire into the whole question of meat inspection in Great Britain.

Captain RUSSELL asked whether it was wished that they should join other associations or send in a separate memorial.

Mr. DICKENSON (Boston) thought they might send in a separate memorial. In the *British Medical Journal* recently, a long article appeared on meat inspection, and details were entered into with respect to the subject. The writer to some extent praised the veterinary profession of to-day, but said that without doubt the veterinary surgeon was not the proper person to adjudicate upon the fitness of human food, but it should be left entirely in the hands of the medical officer of health. He thought that, as the representatives of a large county, they should not allow to pass unheeded this statement that they were not competent to undertake the examination of meat, and to adjudicate upon its fitness for food. He intended to reply to the article through the same medium if the *Medical Journal* would allow a discussion of the matter, for he thought it was reflecting great discredit on the profession generally. He proposed, "That this Society, in view of the recent revelations made in connection with the subject of meat inspection, memorialises the Government to appoint a commission to inquire into the whole question."

Mr. MACKINDER (Peterborough) seconded the proposition. He thought the way in which meat inspection was carried out was absolutely unfair. He had himself been asked to pick out bad meat where the inspector did not know which it was, and then that man had to give evidence when he (the speaker) had actually picked out the meat for him. Their inspector of nuisances had no qualification whatever for meat inspection; he hardly knew a piece of beef from mutton. They (the veterinary surgeons) had to choose which was bad meat, and yet they were said to know nothing about it. The veterinary surgeon was the only man likely to tell whether the animal had suffered from any disease or not, which was the chief consideration in all these cases. He did not think the medical profession seemed to care

much about the question, and he certainly thought that the veterinary profession should have the preference as regards meat inspection.

Mr. SMITH (Huntingdon) remarked that as a practical protest against the way in which meat inspection was carried out, in his own town he applied for the appointment himself, which of course was associated with the inspection of nuisances and of dairies and cow-sheds. He thought it was their duty as veterinary surgeons to make a protest to the authorities respecting these appointments. He pointed out that the reason why he applied for the appointment was because the inspection of meat and of the dairies and cow-sheds could only be properly carried out by a qualified veterinary surgeon. The man who was doing the work at the time was simply a retired shoemaker. The matter came before the Council, and at first he (the speaker) was appointed, but it was found out afterwards that the meeting had not been legally called, certain notices not having been given, and quite an agitation was got up by the retired shoemaker. One worthy supporter of the shoemaker gave as his reason for supporting him was that he understood the use of the lactometer. When the appointment came up for settlement there were seven votes each way, and the Mayor, who had the casting vote, gave it for the shoemaker. He was not at all sorry, for he would rather be without the appointment, as it included that of inspector of nuisances, but he thought that a practical protest should be made against the way in which the inspection of meat was carried out.

Mr. GREAVES (Manchester) said he remembered an instance in which the medical officer of health condemned a carcase as unfit for human food, and the owner of the cow called him in to inspect it and give his opinion about it. On that occasion the medical officer of health brought forward various Acts of Parliament, and made a fine show of his knowledge. He (the speaker), however, said in his evidence that the only ailment that the cow was suffering under was leanness; that she had no sickness, and that the meat was quite fit for human food. One of the magistrates said he entirely agreed with the opinion; the cow was old and lean. He remembered a case where a cow had been working in the fields for twenty years, and was as lean and poor as could be; that cow was killed, and he had the pleasure of eating a steak off her as tender as any he had eaten in his life. The case was dismissed, the Bench being unanimously in favour of the opinion that the beef was quite fit for human food. That proved the medical officer of health was not always right.

The resolution, which had been proposed by Mr. DICKENSON and seconded by Mr. MACKINDER, was carried unanimously.

Mr. GREAVES then read the following paper on

LAMENESS IN HORSES.

It is my intention, he said, to refer to some of the multifarious causes and phases of lameness in the horse, more especially obscure cases, which are more frequently seen than satisfactorily understood, the seat of lameness being often difficult to find out and to diagnose to our own satisfaction. We all of us meet such cases at one time or another, and it cannot but be interesting and useful to us all to discuss them, and become more familiar with their various phases.

No man was ever so completely skilled in our profession as not to receive new information from age and experience, inasmuch as we sometimes find ourselves really ignorant of what we thought we understood, and see cause to reject opinions and theories we had hitherto considered sound.

I purpose to take a general survey of the subject, and with this view I shall bring before you a variety of instances of lameness arising from abstruse

causes; and by directing your attention to these cases we may gain knowledge which must be of benefit to us in our daily life. Some of these cases we can discuss, and also apply ourselves to cases more familiar to us all; and if some useful facts can be gleaned my great desire will be attained.

Percivall, in his "Hippopathology," says, "An observant practitioner will often be able to derive a good deal of information concerning the locality or seat of lameness as the horse stands before him. He sets about inspecting the lame limb and examining it in every part with his hand. Some lamenesses are perceptible to the eye, and discernible by the eye better than by the hand; others are detectable by the hand alone; while, again, there are others that elude detection by either eye or hand, and which can be judged by the action, aided by the horse's manner of standing. A quick eye, judging from the general appearance of a lame horse and from his mode of going, even in the absence of any manifest disease or defect to account for the lameness, will very often discover at once the seat and nature of the lameness."

In 1842, in the Transactions of the Veterinary Medical Association, at page 52, an interesting case is related by Mr. J. Batchelder. This horse would be going sound, but a few minutes' exercise would make him at any and at all times very lame. He was blistered a great many times, fired four times, and also unnerved, all to no purpose. He had fifteen months' rest in a loose box, got sound; he was again conditioned for hunting, when he became lame again. In this case there was observed an artery taking a spiral course over the posterior part of the tendo-perforans in company with the communicating nerve; this vessel could be seen at many yards to pulsate inordinately after exertion; the pressure of this vessel upon the tendon had produced a groove on it. The horse was cast, the artery was obliterated by placing a ligature on both ends of it, and in a short time the horse went quite sound, was regularly hunted two seasons, and the lameness did not return.

In 1847 (*Veterinarian*, page 74) Mr. Gabriel relates a case of lameness in the near fore leg. Blistering, setons, etc., to shoulder were tried, and rest for four months, without the least benefit. He was considered incurable, and was destroyed. Autopsy showed every part of the limb perfectly healthy, but the liver was only half its natural size, much increased in density, and studded throughout with small cartilaginous bodies, which he called asteroides; these bodies were osseous or cartilaginous in their nature, and were, no doubt, the cause of the lameness.

In 1859 (*Veterinarian*, page 591) an interesting case of intermittent lameness in man is related, caused by obliteration of the iliac artery. The patient was fifty-four years old. When he walked for a quarter of an hour he felt in the whole of his right leg a weakness, accompanied with a numbness; if he continued his walk dull pains with prickling sensation were felt in the thigh, leg, and foot, followed by cramp and stiffness of the leg, which he was unable to move. A short rest, and these symptoms would entirely disappear. These attacks would recur five or six times in an hour, but never when in repose, seated, or stationary. Locomotion alone would always excite a recurrence of the paralytic attack; this was followed by great prostration, ultimately by vomiting blood, syncope, and death. It was then found that a tumour completely obliterated the iliac artery.

Several cases are given in French works of lameness in horses, caused by obliteration of the aorta and iliac arteries.

I have brought this case forward because the patient could speak for himself and enlighten us as to what our patients feel and suffer.

In 1889 (*Veterinary Record*, page 366) are described three or four very interesting cases of lameness by Mr. Harold Leeney. The cause or nature

of the lameness was unknown; some of them were lame thirteen or fourteen months, others three years, had various treatment in vain, but by exercise and work the lameness subsided. The writer remarks, "There is little doubt in my mind that others have had the credit of curing lameness, as well as illness, which they have never diagnosed at all."

In 1889 (*Veterinary Record*, p. 12) an obscure case of lameness, so well described by Professor F. Smith, is both instructive and useful. A horse lame, at times very lame, for one year and three-quarters, cause and nature never known; he ultimately recovered. I have seen precisely similar cases; after every means had been employed without success, they have ultimately recovered; had these cases died and been carefully examined, they would, in all probability, have been found to be cases of embolism and pressure on the nerves.

In 1888 (*Veterinary Record*, page 146) is a well-described case of embolism. The horse was sound, fell suddenly lame whilst drawing a brougham six miles; he was so lame that he had to be left in a stable near. He had rest, fomentation, etc, and in a few days he could come out of the stable sound, but could be rendered intensely lame by only a few minutes' fast trotting. This occurred again and again; the lameness was always of the same nature; *coldness of the leg* was the most noticeable feature; he would walk on his toe, and at each step his fetlock would knuckle over; he would stand with his leg raised two inches from the ground, would keep lifting it slightly but frequently, as if in great pain. On examination per rectum, it was found there was no pulsation of the iliac artery on the left or affected side; in this case there was no doubt that plugging of the iliac artery existed, and that it was the cause of lameness.

In 1863 (*Veterinary Review*, page 656) is recorded a case of intermittent lameness, caused by obliteration of arteries; it was an entire omnibus horse, aged eighteen years; he fell down in his work, was unable to rise, or even to move his fore limbs; after a short time he got up and was being led home, but before he had gone fifteen paces lameness showed itself again, and in less than ten minutes his fore limbs trembled violently, became very unsteady, convulsive movement took place in his head and neck, his breathing was laborious, beats of his heart tumultuous, and the animal restless, the expression of his countenance haggard, skin bathed in perspiration, two fore limbs dry, and skin of his limbs *cold*. In half an hour all these symptoms would entirely disappear, but again and again they would come on. He was put to work for a time, and ultimately died; it was then found that the two axillary trunks were filled with hard resistant clots which were firmly adherent to the arterial walls; the muscles of the limb were not blanched, and presented nothing worthy of note, and the nerves were the same.

In 1875 (*Veterinarian*, page 76) Mr. W. C. Ison read an account of a very interesting and useful case of lameness caused by embolism of the iliac artery, before the Midland Veterinary Medical Association. It was a seven-year old bay entire horse; he fell lame in his hind quarters in a strange manner during the last two occasions of his being exercised; the symptoms were great pain and distress; presently these would subside, and he would go quite sound. He could trot, canter, and gallop, then would come on loss of power in his hind limbs, profuse perspiration over his whole body, except his hind quarters, which were *cold* and dry. He knuckled over in his hind fetlock joint, and in the end he died. The iliac arteries were completely plugged with lymph, and the muscles were of a clay colour.

In 1889 (*Veterinary Record*, page 464) Mr. H. Gray relates a very interesting case of embolism in a cart mare five years old. This mare was harnessed in a van, and had not proceeded 100 yards before she fell lame on her off hind limb, the lameness becoming worse after going a few yards farther;

also there were profuse perspiration, roaring, and dyspnœa; the dyspnœa lasted about two hours after resting the mare. After resting six hours, she was trotted fifteen minutes before lameness again showed itself. This mare knuckled over at the fetlocks, the limbs became rigid, neither hock nor fetlock being flexed or extended, occasionally dragging the leg like a piece of wood, and the leg became *icy cold*. She evinced pain on the aorta and iliac vessels being pressed per rectum. The right iliac artery was hard and pulseless. This kind of lameness is not very uncommon; it is sometimes called "kidney dropped," "chinked in the back," "bobby backed," "broken backed," etc., etc.

In 1888 (VETERINARY JOURNAL, p. 319), again, we have another interesting case recorded by Mr. H. Gray, a nag horse, nine years old, lame on his near hind limb. This horse was bought in January, worked regularly up to June, when he became lame; he was fired on both hocks and turned out to grass; in a fortnight he could gallop and was not at all lame, worked well until September, when being driven a short distance, he lost control over his hind quarters, had colicky pains, was in a state of profuse perspiration, trembling, knuckling over on his hind fetlock, back arched, groaning with pain, eyes almost starting out of their sockets. These symptoms subsided, and he was put to work; in a week's time colicky pains came on again; this time he rested a week, was then led a few yards, when he suddenly became lame on his off hind leg, the opposite one to the one affected before. He now would catch the limb spasmodically, as in Stringhalt. The pulse at the aorta and external iliacs was feeble, and on manipulation a non-resistant body was recognisable; the external iliac was obliterated and solid; hind limb cold *off hind icy cold* and paralysed. A *post-mortem* examination proved the correctness of the diagnosis during life. These cases of lameness are not so rare as some would have us believe.

1889. In the *Veterinary Record* for 1889 (page 464) there are related several very good cases of lameness by Mr. Wm. Anderson, of Glasgow, strongly resembling, if not identical with, thrombus or embolism, that is, pressure upon certain nerves and interference in the circulation of the blood to the limbs.

1889. In the *Veterinary Record* (page 398) are several deeply interesting cases of lameness by Mr. Wm. Willis, some of them undoubted cases of thrombosis or embolism.

1889. In the *Veterinary Record* (page 433) see cases of Paralysis, simulating, if not identical with, thrombosis or embolism.

1889. In the *Veterinary Record* (page 26) is a most instructive and valuable case of Azoturia, by Mr. Arthur New. This disease is always attended with sudden lameness, loss of power in the hind extremities, profuse perspiration, and intense suffering. It is a deeply interesting subject to study. Although there has been much controversy on it of late, it is not yet clear what it is. Hereafter, as intellectual development advances, it may be found to arise from a species of embolism and pressure upon certain nerves.

1863. In the *Veterinarian* (page 601) Mr. C. Dickins, of Kimbolton, writes on joint lameness in colts, attributable to lumbricoid worms. He says, "I do not recollect seeing an adult horse affected." He relates a case of a colt three months old, very lame on his off hind pastern, increased heat, and very sensitive to the touch. In a few days he appeared all right, but in about a week there was extreme swelling, with pain and heat over the head of the femur of the same limb; this subsided, but after a while only to recur. This happened over and over again. In a little time a swelling with pain was manifest on the point of the left shoulder, on the opposite side from where he was lame. In a few days he was convalescent again; then he was attacked with gastric pains, from which he died. A *post-mortem* examination showed

the duodenum completely plugged with lumbrici. He calls this a puzzling lameness, and such cases are often symptomatic.

In conclusion, I beg to say that during fifty-five years in my profession I have met with a fair share of these interesting, though oftentimes unsatisfactory cases. The predominating pathognomonic symptoms I have found are suddenness of attack, intense pain, profuse perspiration, knuckling over on the hind fetlocks, and as the disease progresses the affected limb becomes *deadly cold* and helpless. We know of no treatment or medicine that can dissolve or remove the clots or renew the liver. My treatment has usually been hot rugs to the loins, hot salt in bags to loins, cathartics, and rest. Sometimes I have bled, with much advantage. Such treatment has been attended with varied results. I have omitted to go into every-day cases of lameness, finding sufficient matter in these cases, cases written by experienced and eminent men, who are entitled to our utmost respect. They have recorded them solely for the benefit of our profession. I say all honour to them and to all such workers; they are the redeeming feature in our otherwise apathetic profession.

I have written this paper during stolen moments from an active life. Life at best is but a fragment. The ablest and strongest amongst us cannot always use our opportunities as we would. We may have prepared the way for others to sow the seed and reap fruit from the ground we have ploughed and prepared for them. The promised land in our noble profession is not yet gained; it seems very visionary. There are a good many difficulties surrounding the pathway. Numerous deserts will have to be travelled and Red Seas crossed before our profession arrives in the land of Canaan.

The paper was received with applause, and the following discussion ensued:—

Captain RUSSELL said he had listened with very great pleasure to Mr. Greaves's paper on obscure lameness, and all would agree such cases were very difficult to manage. They all met with cases of lameness that puzzled them for weeks, or it might be for months, and especially was this so with intermittent lameness. He had a horse lately that was sound for three weeks or a month, and then for one or two days in the interval was so lame he thought it was putting up a splint. He felt satisfied the lameness was in the foot, and examined it, but found nothing. He had it poulticed, and gave the horse some physic; after poulticing two or three days it was something better, but afterwards fell as bad as ever again. He pared the foot quite near enough for him, but could find nothing. The lameness then seemed to disappear, and the horse went to light work, but after a week was as bad as ever. Feeling sure there was something in the foot, he took the horse to the village smithy, and had the foot pared between the frog and the bar until blood was drawn, but nothing could be seen. He took him home and poulticed him. Afterwards he was pottering about with a knife, and suddenly struck something hard. What's this, he thought? when out shot what he thought to be a stone, but what afterwards proved to be a bony tumour. It came out like a filbert out of its shell. There was a fibrous skin to the tumour surrounding the true growth. The wound healed. The horse was shod, and went to work apparently perfectly sound. The contraction caused by the tumour caused the horse to go lame. (Capt. Russell here exhibited the tumour.) Continuing, he remarked that as the science of surgery improved cases of obscure lameness became more rare. He thought, as he heard some of the reports given in Mr. Greaves's paper, that some which formerly were thought obscure would now be detected by any veterinary surgeon of twelve months' standing, Cases had been mentioned where horses underwent treatment for twenty-one months. Long before that time had passed their clients would now send for somebody else.

The detection of lameness could not be taught. Some people seemed to have an innate power of discovering at a minute's notice where a horse was lame. He had heard speak of a man who could shut his eyes and tell by the sound of a horse's trot where he was lame. He could not himself do that, but if he could not detect the lameness in the horse going down and coming back he could not trust himself to do it that day, but saw the horse the next day.

Mr. DICKENSON (Boston) then related a case which years ago was submitted for his father's opinion. The horse had been in the neighbourhood for years, and had changed hands again and again. While the horse's lameness was under discussion he turned ill of the Colic, and died. The speaker made a *post-mortem* examination of the shoulder to find the cause of the lameness, and could find nothing, until at last he cut through a fibrous substance. Then he found that the horse had three fractured ribs under the scapula, and bony spicules had been thrown out, causing the growth of fibrous tissue around. These spicules pricked the shoulder every time it lifted its leg. It was almost an impossibility to elevate the shoulder, which was mechanically fixed. In another case, where a grey horse presented symptoms of shoulder lameness, he stood in the stable as if he had fractured the radius or humerus. Afterwards he was surprised to find a festered corn. After the corn was removed and the shoulder fomented the horse still remained with a fixed shoulder. He believed the corn was the exciting cause of Melanosis, the horse being predisposed to the ailment. The speaker mentioned that he had a specimen outside in the yard, which he wished the members of the Society to inspect.

Mr. MACKINDER (Peterborough) related a case in which a lady rode a horse hunting, and after a hard day's riding stopped at a gentleman's house for a short time. When she went in the horse was apparently sound; when she came out he was dead lame, and could not put his foot to the ground. There was no heat or swelling, and nothing to be seen. And so he remained, at one time apparently sound, and at another time as though he had broken his leg.

Mr. GRESSWELL (Peterborough) then gave an instance of obscure lameness in a grey horse that had been under his care. When he arrived to see the horse he was apparently as sound as could be, with the exception of the near hind leg. The owner thought he had over-pulled himself; he had been lame two or three times during the previous fortnight. He told the owner to send for him immediately he fell lame again. Three weeks afterwards the horse again fell lame, this time in the near fore leg and off hind leg, and he came to the conclusion that the horse was suffering from melanotic tumour either of the liver or of some internal organ. A slight aperient was given, and next day the animal seemed better, and the near foreleg was then quite sound; afterwards the horse died. A *post-mortem* was made, and the liver was found to be about eight stone in weight, with melanotic tumour. A fortnight ago he was sent for to see a horse lame on the near hind leg. The blacksmith had taken off the wrong shoe; the horse was lame in the off hind leg. He got better and went to work. That very morning the horse had been brought to him lame, of the near hind leg, with no heat of the foot or anything of the kind. He had not the least doubt it was melanotic tumour forming in the liver.

Mr. F. L. GOOCH (Stamford) said a client of his bought a horse which had broken down in the flexor tendons of his near fore leg, to take him backwards and forwards to work. One day the horse came home lame in the off fore leg, and he (the speaker) found the fetlock joint swollen to an enormous extent, double the size it ought to be. The owner said he had noticed the horse stumble two or three times, and he had very likely trod on a stone. The

swelling was reduced by fomentation, and whilst fastened up he got his leg fixed over his chain. He blistered the fetlock joint, and then found the horse certainly exhibited shoulder lameness. He treated him for shoulder lameness, but he did not go on very satisfactorily, and another vet. was called in, who said it was certainly a case of foot lameness, and a third who was called in said it as certainly was shoulder lameness. The horse was sold to a farmer, put to a horse, and is in foal and apparently as sound as can be. His father in his practice bought a six-year-old horse that turned lame, and nothing could be detected. It was fired in the hock, got better, and went to work for twenty years after being fired, when it threw up an enormous spavin.

Mr. SMITH (Huntingdon) told of a case that was lame in the shoulder, sometimes better and sometimes worse for three months. One night they found him with a broken leg. The man said he saw him playing in the stable and then found him lame. The speaker was convinced there was a fracture of the os corona. He shot the horse, made a *post mortem*, and found no disease at all, but the os corona broken into eight pieces.

The PRESIDENT (Mr. Freer) remarked that an excellent paper had brought about a good discussion. Adverting to embolism, he said they, as country practitioners, were not as likely to see cases as were men in towns; and it happened, maybe, two or three times in the course of a lifetime. In diagnosing embolism a great assistance was examination per rectum, then you could make no mistake—the condition of coldness, and the sudden manner in which the lameness comes on. He had a remarkable case of liver lameness. The horse was lame four or five years, and the liver filled a good-sized wheelbarrow after his death. In the case of a four-year-old horse bought at Tattersall's, he was ridden twice, and then went unmistakably lame and could hardly get round his box. The lameness was undoubtedly in the shoulder. The shoulder was fomented, a high-heeled shoe put on, and gradually he got better up to a certain point, but never could get beyond that. He was turned out to grow better, but afterwards went lamer than ever, and was shot. An examination disclosed three holes in the flexor brachii, the head of the bones being completely rotten.

Mr. GOOCH then mentioned a case in which a boy shied a stone and hit the front of the tibia of a horse. He worked for two months, then going home at a jog trot, the tibia smashed into a hundred pieces.

Mr. SMITH mentioned a case of fractured femur, where a horse worked three weeks before separation took place.

Mr. RUDKIN (Grantham) gave an instance of a horse scarcely lame at all, which was turned out, and it was found two days afterwards that the radius was fractured.

Mr. GREAVES added that he had known several instances where a horse had worked two or three days before bones that had been fractured had become separated; he supposed that was owing to the strength of the membranes that hold the bones in their place. He thought they ought not, therefore, to run any risk by allowing horses to work before a fortnight had passed in any serious case.

This closed the discussion, and the meeting closed with votes of thanks to Mr. Greaves and to Mr. Freer for their papers. The members then dined together.

F. L. GOOCH, *Hon. Sec.*

SCOTTISH METROPOLITAN VETERINARY MEDICAL SOCIETY.

A MEETING of the above Society was held in the London Hotel, Edinburgh, on June 26th, the President (C. Cunningham, Esq., M.R.C.V.S., Slateford) in the chair.

The attendance was excellent, and included, among others, Messrs. Hutton, Kelso; Robinson, Jun., Greenock; Pottie, Paisley; Durkie, Dundee; Spreull, Dundee; Brown, West Calder; Lawson, Falkirk; Gillespie, A.V.D., 15th Hussars; Aitken, Edinburgh; Anderson, Glasgow; Aitken, Dalkeith; Peddie, Glasgow; Inglis, Portobello; Robb, Jun., Glasgow; Wilson, Mendota, U.S.A.; Borthwick, Kirkleston; McDougall, Helensburgh; Clark, Coupar Angus; Black, Howgate; Young, Mid Calder; Connachie, Selkirk; the usual press representatives, and the Secretary.

The minutes of last meeting having been read and confirmed, the following gentlemen were unanimously elected to membership: Mr. T. Connachie, M.R.C.V.S., Galashiels; Mr. T. Kay, M.R.C.V.S., Lochee; Mr. A. Love, M.R.C.V.S., Leith.

Apologies for non-attendance were received and intimated from Messrs. Campbell, McIntosh-Bell, Thompson, Professor McCall, and others.

The meeting considered the motion given notice of at the annual meeting by Professor W. O. Williams, to the effect that the Society, believing that Tuberculosis is a contagious disease, urge upon the Government—1st, to stop the sale of milk of animals suspected of being affected by Tuberculosis; 2nd, to suppress the consumption of meat from tuberculosed animals; and 3rd, to give compensation for a limited number of years.

Mr. R. RUTHERFORD, the Secretary, thought that before memorialising the Government they ought to know upon what grounds they were to do so.

Mr. SPREULL, Dundee, considered the purport of the motion was to impress upon the Government the necessity of adding Tuberculosis to the list of diseases coming under the Contagious Diseases Act. He did not think there was any other way of dealing with it. The meeting then debated whether Tuberculosis was hurtful to flocks and man.

Mr. POTTIE, Paisley, said he was not inclined to go the length of saying the disease was a contagious one, and he could not see how they could stamp out a hereditary disease by any Act. He had a paper showing the returns of the Renfrew Insurance Association, where a distinct record of the yearly disease from Tuberculosis was given. Out of 1,900 cattle insured there were about thirty deaths annually, and he found that that was an average number. It was not like Pleuro-pneumonia, where in one year they might have no deaths and another year fifty. Subsequently he said that if the disease was put under the Act it would cost the county of Renfrew £1,000 to pay for its stamping out. It was quite impossible to reduce the number of deaths, although they put it under the Contagious Diseases Act, and to stop the sale of the animals would be an extreme punishment.

Mr. ANDERSON, Glasgow, said he believed that, at a certain stage, the disease was a highly infectious one, but he would not go into the question of the milk or meat consumption. He was a superintendent under the Contagious Diseases Act, and he assured them that at least 25 per cent. of the cases of Tuberculosis, in and around Glasgow, were perfectly agonising to witness. He strongly entertained the idea that the Government should introduce the disease into the Act, so as to prevent its spread in the bovine species. He held that that point should be discussed before the milk question was touched upon.

Mr. ROBINSON, Greenock, also maintained that it was an infectious disease, and that it could be stamped out in twelve months if it were placed in the Diseases Act. He recommended that milk in all cases be boiled for five minutes before consumption, and that no meat be allowed to enter the market.

Mr. SPREULL said the disease was highly communicable from parent to offspring, but he did not think it was clearly proved that the meat had the power of communicating the disease to the human subject.

Professor WILLIAMS shortly spoke to his motion, and held that neither the milk nor the meat could be used.

Mr. ANDERSON, Glasgow, said he would pass as fit for food the meat and milk of an animal only locally affected with Tuberculosis, as the bacilli might be removed. To condemn such flesh as had been recently condemned in Glasgow would be the height of absurdity. He explained that local Tuberculosis was where the disease was in a quiescent state.

Mr. CONNACHIE, Selkirk, said he would schedule the disease under the Contagious Diseases Act, even to the exclusion of Pleuro-pneumonia, as it was both hereditary and contagious.

Mr. RUTHERFORD said that the disease was increasing and called for suppression. No matter how simple the form of the disease, it was identical with the most disgusting form. So far as meat and milk were concerned, he said that it would be difficult to draw the line.

Mr. ANDERSON contended that in the case of young cows slightly attacked with Tuberculosis, the disease might be arrested if the animals were put out to grass in the spring-time.

After some further discussion, the motion to memorialise the Government was carried in the following amended form: "1st, to stop the sale of milk from tuberculosed animals; 2nd, that only veterinary surgeons be employed as meat inspectors, and that they decide what flesh should be passed as fit for food; and 3rd, to give compensation for animals condemned as being affected with Tuberculosis, such compensation to be given for a few years."

The following gentlemen were appointed a committee to draw up the memorial: Professor Williams, Professor W. O. Williams, Messrs. Cunningham, Robinson, Storrie, Spreull, Connachie, and the Secretary.

The discussion of Mr. H. Thompson's paper on "Difficult Parturition" was held over till next meeting.

Mr. POTTIE, M.R C.V.S., Paisley, exhibited his truss apparatus for the reduction of "Scrotal Hernia," described the method of its application, and gave details of several cases illustrative of his contention, viz., that by "the introduction of this truss he had given to the profession a most certain and simple method of dealing with this lesion," the treatment of which had formerly, according to his experience, been very unsatisfactory.

Mr. HATTON'S (of Kelso) paper on "The Use and Abuse of Cake as a Feeding Stuff for Cattle and Sheep" was also, for want of time, held over till next meeting, about the middle of November.

Votes of thanks were awarded Mr. Pottie and the Chairman.

R. RUTHERFORD, F.R.C.V.S.,
Edinburgh, *September 8th*, 1889. *Hon. Sec.*

THE MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

AT the quarterly meeting of this Association held at the George Hotel, Rugby, August 20th, Mr. E. Beddard, of Wolverhampton, presided, and there were also present:—

Mr. A. Goodall, Melton; Mr. B. Freer, Uppingham; Mr. Gooch, Stamford; Mr. H. T. Merrick, Northampton; Mr. Bainbridge, Wellingboro'; Mr. Barling jun., Ross; Mr. Cole, Hinckley; Mr. H. Olver, Tamworth; Mr. R. Verney, Stratford; Mr. Wartnaby, Burton-on-Trent; Mr. R. C. Trigger, Newcastle; Mr. Wragge, London; Mr. J. Wiggins, Market Harboro'; Mr. A. Over, Rugby; Mr. J. S. Barber, Rugby; Mr. C. W. Crofts, Rugby; Mr. Avis, Wellingboro'; Capt. Russell, Grantham; Mr. F. B. Jones, Leicester; Mr. G. M. Parker, Leicester; Mr. H. Stanley, Birmingham; and Mr. J. Malcolm, Birmingham, Hon. Sec.

The meeting considered the appointment of a committee to examine the horses operated upon for roaring by Professor Axe.

The PRESIDENT said the operation was an important one, and he thought it would be desirable for each case to be reported upon properly and officially. Therefore he thought it would be best to appoint a committee.

Capt. RUSSELL suggested that the report should be made with as little delay as possible for the information of the members; and he asked whether it was proposed to report upon the present condition, or upon the alteration which had taken place from their original condition?

The PRESIDENT replied that as far as lay in their power—both.

Mr. TRIGGER moved that a committee of five be appointed. Mr. MALCOLM seconded. The resolution was put and carried.

The Committee was agreed to as follows:—The President, Mr. Jones, Mr. Over, Mr. Cartwright, Mr. Trigger.

On the suggestion of the President, the Secretary was instructed to write to Prof. Axe and invite him to be present.

On the question of revising the rules of the Association, Mr. WRAGGE moved that the rules be referred to a committee of five, viz., the President, the Hon Secretary, Mr. Parker, Mr. Trigger, and Mr. Stanley, and that they submit the revision to the next meeting.

Mr. FREER suggested that, as many members had to go away from the meeting without refreshing themselves and enjoying a social chat afterwards, it would be as well if they followed the example of the Lancashire Association and hold their meetings at 12 30, and have dinner at 2.30 or 3 o'clock. The meeting should finish at all events an hour earlier than put down in the revised rules.

Mr. GOODALL, supporting that suggestion, said there was often more practical discussion over the dinner-table than at the meeting.

Mr. TRIGGER said they must leave all that in the hands of the Committee.

Mr. Wragg's proposition was then adopted.

Mr. WRAGG suggested that the report of the Committee should be printed and circulated among the members before the meeting takes place.

This was agreed to.

The SECRETARY read letters of apology from Professors Walley, Williams, Axe, Penberthy; Sir H. Simpson; Messrs. Wilson, Kidd, Wolstenholme, Lodge, Blakeway, Leather, Perrins, Carless, Barling, Cartwright, Pritchard, etc.

He also read the following letter from Professor Walley:—

Royal Dick Veterinary College,
8, Clyde Street, Edinburgh,
August 14th, 1889.

DEAR SIR,—

I am in receipt of your invitation to the meeting of the M.C.V.M.A., to be held on the 20th current, and need scarcely say that had I been able I should have felt the greatest pleasure in accepting it.

I am very anxious that the profession should make a firm stand *in re* the "Inspection of Meat," and the inclusion of Tuberculosis in the list of contagious diseases, and in no way can this stand be better made than by resolutions adopted at the different meetings of associations.

I asked Mr. Banham to request the President to propose a motion to the National Association *in re* Inspection of Meat, but as I did not give time for notice the request was not complied with.

The two motions I would like to have carried are (1) That Tuberculosis (with certain modifications to be determined by the Privy Council) ought to be included in the Contagious Diseases (Animals) Act; (2) That the meeting

(of the association) memorialise the Government to appoint a special (or Royal) Commission to inquire into the whole question of Inspection of Meat in Great Britain.

Wishing you a happy and a good meeting,

Yours very truly, THOMAS WALLEY.

John Malcolm, Esq.

Mr. TRIGGER said they had such a resolution on the books, passed at the Stafford meeting.

The SECRETARY said there was no resolution that it should be forwarded anywhere.

Mr. STANLEY proposed that the resolution as passed be forwarded in the proper manner.

Capt. RUSSELL: With such addenda as will comply with the letter.

Mr. TRIGGER said they were out of order. They could not do anything with regard to a resolution passed at the last meeting without notice. He therefore proposed that the resolution appear on the agenda for the next meeting.

Mr. MERRICK seconded, and it was carried.

A letter from Professor Williams was read offering his testimony as to the value of the operation for Roaring.

The following members exhibited pathological specimens:—

Mr. A. OVER: An abortion after eight weeks' service, showing that after a few weeks a mare may abort, and the fœtus be swallowed by fowls or dogs and not be seen.

Mr. VERNEY showed a testicle taken from a horse rising three years old. It did well under the operation and was perfectly quiet. The testicle used to come down occasionally and go back and could not be found, until he caught it "on the hop" one morning, cast the horse and took it away.

Mr. TRIGGER then proposed that Professor Penberthy be elected an Honorary Associate of this Association.

Mr. MERRICK seconded the resolution.

The PRESIDENT then put it to the meeting, and Professor Penberthy was unanimously elected.

On the proposition of Mr. STANLEY, seconded by Mr. TRIGGER, Derby was chosen as the place for the next meeting.

A vote of thanks to the President by Mr. OLVER and seconded by Mr. STANLEY, and carried by acclamation, terminated the proceedings.

The members afterwards dined together as usual.

Mr. MERRICK read the following paper:—

A RECENT OUTBREAK OF ANTHRAX.

In a few remarks I purpose making to you, I do not intend giving a minute description or history of the fatal disease, Anthrax or Splenic Apoplexy, for most of us, especially if we be country practitioners, are only too familiar with its character. It is simply my intention to give as clear an account as lies in my power of what has been to me a very interesting outbreak of the disease, and I hope in the discussion which follows, we may each and all gather some fragments of information which in the future may prove beneficial, not only to ourselves, but to our clients.

You are all doubtless aware that since June, 1886, Anthrax has been one of the diseases included in the schedule of the Contagious Diseases (Animals) Act, and in my opinion most properly was it so included, for the risk to the human subject while handling the carcase of an Anthrax-stricken animal is well known to us all. In my practice I have seen several instances of the danger incurred, and indeed in one case the result was fatal.

I will now proceed to give the history of this particular outbreak that in the past two years has come under my notice.

On July 26th, 1887, I was summoned to attend at Cottesbroke to examine the carcases of two bullocks found dead that morning. These animals, with fifteen others, had been for about three months lying in a field called Mickley Meadow, one field among several known as Cottesbroke pastures, the property of Sir J. Langham, and this field with three more adjoining, was then in the occupation of Mr. G. Adnitt.

The *post-mortem* examination unmistakably shewed that Anthrax was the cause of death; the spleens were much enlarged, and on being cut into, thick tarry-looking blood exuded, the heart also showed those peculiar blood-stains in the ventricles, the mucous membranes of the rumen also peeled off on being lightly scraped with a knife, and the blood on being submitted to a microscopical examination was full of the rod-like bacilli found in the blood of Anthrax-stricken animals. The carcases I had drawn into an adjoining spinney and buried with six or seven feet of earth above them, and well covered with lime.

The other beasts were at once removed by my orders to another field, and to each was given a drink consisting of Soda Hyposulph. ʒiij, Pulv. Zingib. ʒij, Pulv. Cinchona ʒi and Acid Carbolic ʒi, to be repeated in three days' time. Two days afterwards I received a telegram saying another beast had died. This I did not think it advisable to open, for all the external appearances pointed to Anthrax: froth exuding from the nostrils, and blood from the anus, and I always consider it of importance to avoid, as much as I am able, contaminating the land, particularly as in nine cases out of ten it is pasture land. It now became a serious consideration as to what was to be done with the remainder of the herd, and I was directed by the local authorities to take the temperatures of the animals still alive, with the view of sending them to be slaughtered if apparently healthy. The result was marked; in twelve the temperature was normal, 102° or less, but in the other three the thermometer registered in one case over 106°, and in the other two over 105°, and two days afterwards two of these animals were found dead, and the remainder after being isolated for fourteen days were slaughtered and sent to London.

On August 13th of the same year, Mr. T. Gossage lost one of a herd of beasts in a field a short distance away; this animal was drawn into an adjoining spinney, and there the *post-mortem* examination proved conclusively that death was due to Anthrax; the other beasts were twice drenched, and no further loss resulted. It is unnecessary for me to relate *seriatim* the further losses Mr. Adnitt incurred; sufficient to say that between July and November in the year 1887 he lost thirteen beasts, which were lying in three adjoining fields, viz.: Langlands, Mill Dykes, and Mickley Meadow, and he determined to relinquish the keeping.

It was then let to Mr. Gossage, of Creaton, who almost immediately put eight head of stock in Langlands, and on December 11th one was found lying dead; these animals, I may remark, had been in Mr. Gossage's possession six months. The fields were not stocked during the summer, but lain for hay, and no further fatalities occurred till December 1888, when one of three heifers which had been grazing in Langlands died, and most certainly the *post-mortem* revealed the presence of Anthrax. The other two beasts were removed and drenched, but a fortnight after eight more were put in this field, and on January 3rd, 1889, one of these was discovered dead. I may here mention that one of three calves, about two months old, and kept at Mr. Gossage's home farm, three miles away, died of Anthrax. It had been fed on nothing but milk and the hay got from those fields in the preceding summer. Mr. Gossage now retired from the keeping, which was taken by

Mr. W. Ashley, of Long Buckley, who grazes a large number of stock, and on April 28th one of fifty-eight beasts lying in Mill Dykes was found dead. The remaining fifty-seven were moved into an adjoining field, and this, like all the other carcases of animals that had died of Anthrax, was carefully moved and buried in an adjoining spinney. On May 8th one out of twelve died in Mickley Meadow, and another on the twelfth of the same month.

Matters having now become very serious alike for owners and occupiers of the land—nearly a score of beasts having died in less than eighteen months, and no doubt many more would have succumbed if the land had been stocked the whole time—Mr. E. K. Fisher, the agent of the estate, requested the services of Professor Penberthy to inquire into the nature and cause of the outbreak. He attended on May 22nd in this year, and I met him. He made an exhaustive inquiry as to whether there had been loss in previous years in those fields, which there is no doubt there has been. He was of opinion that the disease was undoubtedly Anthrax; that the outbreak was due to animals having either been buried or dressed in these fields; and that the best means of preventing further loss was by inoculating animals put in these fields with attenuated virus, after Pasteur's method, which it is asserted has been so successful in France. Mr. Ashley, a few days after, undertook to provide some cheap beasts to be inoculated, and Mr. Fisher, on behalf of the estate, undertook to guarantee him against any loss. On May 31st, Professor Penberthy attended, supplied with the requisite virus procured from Pasteur's laboratory in Paris, and I also attended to assist him. Fifteen animals, which had been recently purchased, were driven from a field in which Anthrax has not as yet shown itself, to an adjoining pen where twelve were inoculated. The operation is simple; the animal was nosed, and about fifteen minims of the virus in solution was injected by means of a hypodermic syringe into the loose tissue behind the elbow on the right side. Three were not subjected to the operation, with a view of, if possible, getting positive as well as negative results.

The temperature of each beast was taken before being inoculated, and in every one it proved to be perfectly normal. They were then placed in the field they came from, and twelve days afterwards, on June 11th, were again inoculated, this time on the left side, with a less attenuated virus, and after an interval of four days were turned into Langlands and Mickley Meadows, where most of the fatal cases have occurred. They showed no unfavourable symptoms of any description after either operation, and up to the time of writing no deaths have taken place; I saw these beasts last week, and they have improved vastly in appearance. One thing therefore appears certain, that the inoculatory process is not dangerous if properly performed, and in this case we have at any rate partial proof of its preventive power; but I must say I should like to have seen at least one of the uninoculated beasts succumb to an attack of Anthrax.

On May 23rd, Mr. Clark, who rents some land two miles from the valley, found a cow dead; this animal had been ailing some time, and I was quite prepared to find the cause of death due to some other disease than Anthrax; and my opinion was first confirmed, for on opening the animal I found nearly every important organ affected with Tuberculosis in an advanced stage; but on examining the spleen I found all symptoms of Anthrax present, and excessive ecchymosis around the heart. I gave it as my opinion that Anthrax was the cause of death, but to have it substantiated I sent a portion of the spleen to Professor Penberthy (whom I have to thank most heartily for his courtesy and the trouble he has taken in assisting me with his advice), and he wired to me that the blood swarmed with bacilli. Mr. Clark lost no more animals in this field, neither have there been any other cases of Anthrax in the Cottesbroke district up to date.

It may be remembered that in the spring and early summer of 1888 we had heavy rains and floods in low-lying meadows, and hay lying cut and being made was flooded, and afterwards when it was got, it was, in most instances, unfit for horses at any rate, if not for other animals. Mr. Gilby, of Spratton, had twelve beasts lying in two fields in which, so far as is known, no animals have hitherto suddenly died; they had been in his possession over nine months. Early in March he commenced feeding them on some of this hay that had been flooded, and on March 28th of the present year two were found dead. They were removed by a butcher, who at once recognised the character of the disease, and I was sent for, and again Anthrax was the cause of death. The remaining beasts were moved into another field; they were no longer given the hay, and no more cases occurred.

Mr. B. Draye, of Brampton, about this time had several cows lying in his home yards, and fed on hay that had been flooded, and in the course of a few days three died after short illness, and though the *post-mortem* appearances were not so marked as in some cases, yet there is small doubt but death arose from Anthrax.

But the most marked case I have had pointing to flooded hay producing the disease, is the following: Mr. Bull, of Brampton, bought some flooded hay, and in a fortnight after giving it to his stock he lost a horse, two bullocks, and five calves. Unfortunately, I did not see either the horse or bullocks, but as they were all apparently well at night and found dead in the morning, I think there is little doubt but that they died of Anthrax. On making an examination of the carcases of two of the calves, the last that had died, I found marked evidence of the disease, indeed, the spleens in these young things, not two months old, were as large, if not larger, than in the adult animal. They had been kept and fed on nothing but skimmed milk till four or five days before they fell, when some of this hay was given, with the result recorded: the hay was stopped, the remaining seven were turned out, and no more loss occurred.

Mr. Eydes, of Little Houghton, also had a cow die that, while lying in his yard, had been fed on flooded hay gathered from a field in which Anthrax had been present a few years ago. A sow lying in the same yard was noticed to lick up the blood exuding from the anus; three days after she appeared unwell, and when I saw her I found throat and head excessively swollen, and for some days she was able to take little, if any, nourishment; but eventually she recovered, and pigged a fortnight later, all the litter being alive and healthy.

Lately, I am glad to say, in our district we have been freer from this disease; for though of course isolated cases occur, the worse affected districts have escaped. And here I may remark that I often think it would have been as well if the old term Splenic Apoplexy had been retained; for in Anthrax farmers do not recognise their old enemy, but often speak to me of it as quite a new disease; whereas it is, as we know, of very ancient origin: some even asserting that the plague of boils on man and beast with which the Egyptians were punished, and which is spoken of as "a breaking forth of blains upon man and beast throughout all the land of Egypt" was due to Anthrax.

With regard to the flooded hay producing Anthrax, I wish to ask your opinion. Do you consider it possible for the spores of the disease to have been washed down by the flood from an infected locality and deposited on this hay? For though we have had numerous cases at Cottesbroke, none, so far as I can hear, have occurred down the valley, with the exception of those related above, which had been fed on this hay. These fields are quite four miles as the crow flies from the Cottesbroke fields. There is not the slightest doubt that fields in which animals have died of Anthrax,

and perhaps been carelessly buried or dressed, are laden with the spores of the disease; and in my opinion a spring like the one just passed, with heavy rains followed by warm weather, is most likely to be succeeded by an outbreak.

Now the main question is, What can be done to prevent the attacks of this ruinous complaint? Animals attacked are a dead loss to the owner, there being no compensation, and hoofs, horns, and hide are all bound to be buried with the rest of the carcase. Cure, as we know, is out of the question, for in ninety-nine cases out of a hundred the animal is dead and stiff when we are called in. The first thing that suggests itself is advising that pasture should be turned into arable land; but that, apart from the inconvenience in most cases, is not always in every way remedial, for in one instance that came under my notice, where turnips were grown on land on which beasts had died, the sheep fed on them were violently attacked with Anthrax. There is no doubt but that if greater care had been taken in the past in the disposal of the carcases of Anthrax-stricken animals, we should not have such frequent losses in the present day, and I am always careful to order the removal of the carcase of a suspected animal to arable land, or, better still, to some wood or spinney, if such happen to be handy. Undoubtedly the best means of disposing of affected carcases is by cremation, but I am afraid the expense that would be incurred is too serious an item. I have given the drink I mentioned early in this paper to animals among which Anthrax has appeared, but I do not place much faith in the prophylactic properties of medicine in these cases. I always advise the owner to remove the herd into another field as soon as possible, and I think this is highly important.

If, as it is asserted, inoculation with the attenuated virus has been attended with such success in France, to that process I think we must look to protect animals placed in what I term anthrax-affected fields. The protection given by the operation is stated to last at least twelve months, and that length of time is quite sufficient for the feeding of store beasts. The risk is almost *nil*, the operation simple in the extreme, and the expense certainly of little moment.

The PRESIDENT opened the discussion. He thanked Mr. Merrick for his instructive and practical paper. Strange to say, he never knew but one outbreak in the whole of his district, and it was supposed by Professor Simonds and other experts to be due to a very free dressing of bones in a raw state to the land some few years ago.

Mr. OLVER said Mr. Merrick had left very little to discuss. He could trace several cases, which showed that the transformation of pasture into arable land was not preventive of Anthrax. In one case where a number of beasts had died, the land was first put into wheat and then white turnips, which meant two years, and of the cattle fed on the turnips a number died of Anthrax. As Mr. Merrick said, cattle dying of Anthrax were too often buried in the fields in which they died, and it had been proved that the bacilli found their way into the worms and by them to the surface. How the spores existed in flooded hay was not satisfactorily explained, but there was little doubt they remained in it, and were transformed into bacilli after transmission from the animals. To show how readily disease might be passed from one animal to another—an animal died last year, it was believed of Black-leg, but no doubt it was Anthrax; it was buried in an arable field in which only sheep were allowed to run. They began to die, and microscopical examination showed the rods of Anthrax bacilli. Never before had Anthrax been known to exist in that field. He would advise that the land, if pasture, should be thickly manured with lime, which, he believed, had the power of killing most organisms, and was in every way beneficial to the

land. He was glad to hear from Mr. Merrick that Professor Penberthy's inoculation had been so far successful, and that it had not caused any mortality. It was very important to veterinary surgeons, because they could recommend with some confidence that animals should be inoculated. But he should like to see, especially in breeding districts, that this Pasteur system would render animals secure not only for one year, but for a period. As to the outbreak the President spoke of, with all respect to Professor Simonds, he very much doubted whether it arose from the free distribution of bones. They would not expect at the present day to see Anthrax bacilli produced by bones.

Mr. TRIGGER said they often could not diagnose Anthrax animals, they were generally dead when they were called in; but it was interesting to find confirmation of the value of their little pocket friend the thermometer. He should like to know whether, in the temperature taken of the animals, there were any indications of disease in the system. He had no doubt they got isolated cases, and as a striking example of it he mentioned an instance where he found some pigs suffering from Anthrax, and he ascertained that they had been fed on what the local farrier said was a "struck" calf. It was no doubt Anthrax, but they would never have known that it had existed if the pigs had not eaten it. It was satisfactory to hear Mr. Merrick's account of the inoculation, but he must wait a little longer before he felt perfect confidence in this protection. He did not wish to depreciate anything of an onward scientific tendency, but he did not think Mr. Merrick was out of the wood yet. They could speak with more confidence after another season had gone over the field. A weak point in the case was that none of the uninoculated animals had died of Anthrax. With regard to converting pasture into arable land, undoubtedly it was not efficacious, but it was a desirable thing to do He should like to ask Mr. Olver whether the turnips produced Anthrax if given to animals not on the land.

Mr. OLVER said they were in a shed, but soil adhered to the turnips when given to them, and it was fair to suppose that the disease was conveyed by the soil.

Mr. TRIGGER said that rather upset the theory of converting pasture into arable land.

Mr. OLVER having quoted an instance of an isolated case,

Mr. GOOCH asked Mr. Merrick whether a stream ran down the valley, with places were the animals could drink, and whether the spores were conveyed by the water as well as the hay. He mentioned a case where a horse died from Anthrax. On investigating the case he found that a cow had died suddenly of Anthrax, and had been dissected in an upper yard through which water ran from a spring to a lower yard, where there was a trough from which the horses drank. Being certain that the case was conveyed by the water, he sent a gallon to Professor Tuson, and he came to the conclusion that it contained spores and bacilli. The spring was closed, and from that day to this there had not been a case of Anthrax.

Mr. WARTNABY described a case in which he was called in to see thirteen dead fat beasts, the property of a brewer, who was under the impression that they had been poisoned. He suggested that Anthrax was the cause, and the brewer's chemist on examining the blood found Anthrax bacilli. The beasts were lying in three fields, with one common pond as a drinking place. He advised that the remaining animals should be removed, and, with the exception of one dying on the day following their removal, there was no further loss. So certain was the bailiff that the beasts died from poison, although it was clearly proved to the master that it was not the case, that eleven cheap beasts were put into the fields, and three or four of them died in the next four days. The remainder were then removed, and no

further loss took place. He (Mr. Wartnaby), believing it was the water, advised that the pond should be drained. That was done, four or five years ago, and although the fields had been since grazed with sheep, horses, and beasts, there had been no further loss. The unsatisfactory part of the business was that no explanation as to the original cause of the outbreak could be arrived at. The oldest inhabitant could not remember a similar case, and it was doubtful whether such ever occurred. He should like to know how long the spores were supposed to exist in the soil, and was there any other explanation for an outbreak of this kind? A case that occurred since, about seven or eight miles away from this place, was due to eating flooded hay which came from pitholes. It was very far-fetched to be told that many years ago beasts had been buried there, and worms had been working up the germs and had at last reached the top this year for the first time, and probably never afterwards. There had never been a case of the kind on the farm.

Mr. BAINBRIDGE quoted a case where a short-horn died of Anthrax, and he advised that the carcase should be buried. That was done, but the offal was given to the dogs, which were then attacked. Another beast died and the carcase was sold to a butcher, who ate some of it himself, but without any deleterious results. He thought it strange that these carcases should be eaten with impunity.

Mr. MERRICK: Not at all, if it is cooked.

Mr. BAINBRIDGE, continuing, said the dogs ate some, but were not attacked; and he added that a great deal of locust beans were used in feeding the beasts.

Mr. FREER, after alluding to the death of Mr. Fisher through being bitten by a fly while examining a horse which was supposed to have been poisoned, but most likely was suffering from Anthrax, referred to the ploughing up of land. In one case where an outbreak had occurred, he advised the tenant to get his landlord to turf the land first, burn the turf, mix the products of combustion with lime, and plough the mixture in deeply, let it lie for the winter, and sow what he thought best. The landlord would not allow him to do that, but said he could lay the land. It was laid for hay and mown the next year. It was an exceptionally good year, and there were no floods. The hay was carted a mile and a half away, some Norfolk beasts were wintered upon it, and unfortunately the tenant lost half of them. There had not been a case of Anthrax there before. Mr. Freer went on to say that in his district there was an infected field in which the carcases of at least forty beasts that had died of Anthrax were buried. The Welland ran by that field, but while he had never known a case on the land below it, or down stream, he had seen scores of cases above it. In his opinion, the best way was to cremate the carcase, and the next best way to bury it deeply with very large quantities of lime. This very field, during the tenancy of one man, was limed year after year, but Anthrax still existed; although not to the extent it did formerly. The last outbreak was in 1888, and the tenant was so sick of it that he grazed the field with geese, and fortunately did not have any losses.

Mr. GOODALL said there was a field in his district in which, if they put beasts for very long, they were bound to have Anthrax. It had been subject to it for the last twenty-five years, but the occupier now knew how to manage it; he did not let the beasts stop in it long enough.

Mr. BARBER asked whether carcases were buried there in the time of the Cattle Plague?

Mr. TRIGGER asked whether horses were ever attacked there?

Mr. GOODALL replied in the negative to both questions; and added that the beasts were not allowed to remain in the field longer than a month.

Mr. MALCOLM had had very little experience in Anthrax, but he remembered one case, where a two-year-old bullock was attacked upon a farm where they had never seen Anthrax before, and from that day to this there had never been another case. In such cases it was very difficult to trace the source from which the disease arose.

Mr. OLVER said one thing had not been named. It was perfectly understood that if animals suffered from Anthrax without bloody issues in any form whatever, there was no danger if they were buried at once, because atmospheric air was necessary for the development of the bacillus.

Mr. WIGGINS said he had had some little experience of Anthrax in the two districts for which he was inspector. He had often been puzzled as to the origin of outbreaks, so exceptionally opposite had the circumstances been. They should only flounder in the mire in attempting to obtain a correct history of the why and the wherefore of these outbreaks, until they knew the life-history of the fatal germ. If they considered that the agencies for the distribution of the disease were legion, they could not wonder at any eccentricity in the outbreaks. It had been said that the earth-worm contained the spores of the bacillus, and these germs had been proved to exist for years without being devitalised, certain circumstances being only necessary to render them fertile in all their destructive power. Then again the fly was a potent agent, of which they had painful instance in the case of their friend Mr. Fisher. If they had an animal suffering from disease, flies would be found all over it. They pierced the skin and poisoned their probosces, and away they went perhaps to bite some other animal, and infect it by inoculation. Then, again, the worms which contain these spores leave them in their mounds on the surface. The heat of the sun and the trampling of animals, convert them into dust, which is wafted by the wind to pastures far distant, and why then should they wonder at the eccentric distribution of the disease? He would impress upon them the necessity of seeing that the infected animals were properly and expeditiously despatched, buried not less than six feet deep, and largely accompanied with lime, two tons under and two tons at the top of it. His instructions were to use plenty of lime, and the authorities allowed an unlimited supply. Then, again, game running about, foxes marauding, men mushrooming in the morning, were probably means of distribution. They knew it was only necessary to take a filament of the frothy mucus from the nostrils, or a portion of the bloody serum, and the partridge, the hare, rabbit, or fox, or the foot of the man became fertile sources of distribution, showing the necessity of promptitude in despatching the beast and securing proper burial. Cases occurred from flooded hay, they cropped up from land converted into arable land, and he was convinced it was carried by water. As an instance of the latter, he mentioned a case where several of fifty-seven beasts in a farmyard were stricken. The water, he was told, came from the uplands, but he found that it was brought by ordinary tiles which passed close by the corner of a field where the manure from the yard was deposited. On examining the well into which it ran, it was found that there was a considerable depth of silted sewage. By his advice the well was thoroughly cleaned out, and several cart loads of unslaked lime were tipped into it, and since then—six years ago—the yard had been free from Splenic Apoplexy.

Mr. MERRICK, replying on the discussion, mentioned an instance at Beddington to show that the change of pasture into arable land was not a preventive. In these very fields at Cottesbroke this year, sheep had been dying, and they thought nothing of it. He reported it as Anthrax, but when Professor Penberthy came down, one happened to die. He said any one would call it Anthrax, but on putting the blood under the microscope there were no traces of bacilli, and he called it Braxy.

Several members said they always considered that was the same as Anthrax.

Mr. MERRICK continuing, replied to a question by Mr. Trigger as to whether there was any rise of temperature in the three animals referred to in the paper. They were just as well as any of the others—there was no difference in the hair—no turning—and no rise in the pulse. He thought very often that isolated cases of supposed Splenic Apoplexy were really Epilepsy. He had found cases where animals had died suddenly, but there was no indication of Anthrax. As to inoculation, it had been tried in France with great success—more particularly in Brittany, with sheep. There it had been successful, and there was no reason why it should not be successful here. Having related an instance where traces of arsenic were found in beasts that had died, and which was ultimately found to be in the water supply coming from some ironstone mines a considerable distance away, Mr. Merrick said there was no satisfactory information as to the life of spores, and he thought it would take a lot of finding out. First of all they had got to find out the spores.

Capt. RUSSELL.—Don't they produce themselves?

Mr. WIGGINS said if oxygen was kept from the bacillus for twelve hours it died, but the spores lived indefinitely.

Mr. MERRICK, proceeding with his remarks, said horses suffering from Anthrax certainly lived longer than cattle; he believed dogs were less susceptible than other animals to the effects of eating the meat, but he had known several dogs killed by it; and at the beginning of the season, Mr. Goodall told him his hounds were no doubt suffering from an attack of Anthrax through eating anthraxed meat. As regarded the conveying power of water, he considered it a good subject for discussion. He did not think the spores of the disease could be taken into the system from drinking, because cattle as a rule, except in a very dry season, drink very little. He did not say it was the case, but he had known instances of the disease where there was no drinking place at all. With regard to what Mr Wiggins said about worms, no doubt in a season like the present—wet and warm—they did work up to the surface, whereas in a dry season they did not.

Capt. RUSSELL moved a vote of thanks to Mr. Merrick.

Mr. WIGGINS seconded, and it was unanimously carried.

Army Veterinary Department.

Gazette, September 3rd.

Inspecting Veterinary Surgeon James Joseph Meyrick, C.B., F.R.C.V.S., to be placed on retired pay. Dated 6th September, 1889.

Veterinary Surgeon, First Class, Francis Walker, to be Inspecting Veterinary Surgeon, ranking as Lieutenant-Colonel, vice J. J. Meyrick, C.B., F.R.C.V.S. Dated 6th September, 1889.

Gazette, September 6th.

YEOMANRY CAVALRY.—Hampshire (Carabineers). Harold Leeney, gentleman, to be Veterinary Surgeon.

Gazette, September 10th.

1ST LIFE GUARDS.—Veterinary Surgeon, First Class, John Denis Edwards, to be Veterinary Surgeon, First Class, vice F. Walker, promoted. Dated 11th September, 1889.

VETERINARY DEPARTMENT.—Fitzpatrick Eassie, gentleman, to be Veterinary Surgeon on probation, in succession to Veterinary Surgeon, First Class, Francis Walker, promoted. Dated 11th September, 1889.

Gazette, September 13th.

MONTGOMERYSHIRE YEOMANRY CAVALRY.—Veterinary Surgeon D. Rowlands resigns his commission; also is permitted to retain his rank, and to continue to wear the uniform of the regiment on his retirement. Dated 14th September, 1889.

Victoria Government Gazette, July 10th.

Veterinary Surgeon W. D. Snowball, of the Mounted Rifles (Ballarat), has been promoted to be Inspecting Veterinary Surgeon of the Victorian Military Forces, with the rank of Major.

The Army Veterinary Department has sustained a heavy loss through the retirement from the service, owing to attainment of the prescribed age, of J. J. Meyrick, C.B., one of its best officers. Mr. Meyrick has earned a good name for himself throughout his long career, not only for his conscientious zeal and care in the discharge of his duties at home and abroad, but also for his genial and obliging disposition towards his brother officers. He was the first Army veterinary surgeon to receive the C.B. for his distinguished services during the Egyptian war of 1882, on which occasion the Khedive of Egypt also bestowed upon him the Order of the Osmanieh. So much was he esteemed by the officers of the department in Ireland, where he was Inspecting Veterinary Surgeon, that on his retirement they presented him with a piece of plate. He carries with him into private life the good wishes of all who knew him, and it is to be hoped that he may have many years of good health in which to enjoy his well-earned rest, after so long a period of activity.

In the last number of the Journal mention was made of the manner in which Lieutenant Beech, late of the Department, had again recently distinguished himself in Egypt. The following allusion to it is from the despatches of Major-General Greenfell, K.C.B., published in the *Gazette* of September 6th:—

"The Cavalry under Second Lieutenant J. R. Beech, C.M.G., commanding Halfa Cavalry, has throughout the operations hung on to the Dervish flanks and rear, and punished them severely. Lieutenant Beech has shown great qualities as a Cavalry leader, and in the charge both he and Lieutenant G. C. C. d'Aigular, 17th Lancers, led their men with great gallantry. His subordinate native officers behaved remarkably well."

Inspecting Veterinary Surgeon F. Walker has embarked for a tour of service in India, proceeding to Meerut, where he relieves Inspecting Veterinary Surgeon Russell, who goes to Simla as Principal Veterinary Surgeon in India.

Veterinary Surgeon Lewis has also embarked for a tour of service in India.

Obituary.

THE following deaths among members of the profession have been reported:—

J. Kirkpatrick, M.R.C.V.S., Maxweltown, N.B.	.. graduated in	1831
H. Seton, M.R.C.V.S., Edinburgh	„	1835
G. H. Darwell, M.R.C.V.S., Northwich, Cheshire ..	„	1847
T. C. Dobson, M.R.C.V.S., Christchurch, New Zealand	„	1872-79
G. Ellison, M.R.C.V.S., Chorley, Lancashire	„	1884

Notes and News.

"VACCINATION" AGAINST THE SIBERIAN PEST.—A large Russian breeder at Kaschowka has had two flocks of 8,000 sheep "vaccinated" against this disease. Two "vaccinations" by Veterinary Professor Schalaschnikow, of the Charkow University, were applied to each sheep, increasing in strength, and the results thus obtained left nothing to desire. After the first vaccination one sheep only died, and two after the second. To give more weight to the usefulness of this vaccination, it so happened that amongst the other non-vaccinated flocks of this breeder a great number of sheep succumbed to the epizoöty, which did not attack a single head of the two vaccinated flocks.

THE FIRST DAYS OF A LAMB.—About five minutes after a lamb is born he is on his feet. The unsteady earth under him now heaves to the right, surges up and then down, and whirls and twirls with him while he staggers, struggles, and twists one leg around the other like a vine around a tree, or else he spreads those members all out until they look like the forks under a weather vane. He tumbles down for the fiftieth time, and for the fiftieth time renews the fight to secure that footing in the great world from which only can he reach the life-giving milk. His mother—particularly if it is her first—in her crazy anxiety to help, knocks him down, steps on him, and does—without leaving out a possible exception—everything she should not do, while she leaves nearly everything undone that might help the little fellow to get the desired nourishment. "Oh, the poor, dear little thing; isn't it too bad?" says the sympathetic stranger. "The confounded pair of idiots!" frets the impatient shepherd, who does not care to drive them until the lamb finds milk. In half an hour his sides bulge out; and as the shepherd slowly urges the old ewe towards home, the lamb goes reeling and rolling along like an old tar just ashore from a year's voyage. About the first error the lamb makes in life is to mistake the shepherd or his dog for its mother, and many are the manœuvres that must be gone through with to make the new arrival follow the right party. His next error is likely to be an attempt to walk on air when he comes to a place where he should go down hill. His ten minutes' experience in life has made him believe that all the earth is a level plain, and in broad daylight he steps off the top of a hill just as serenely as a man steps off the top landing of the stairs in total darkness when he is certain that the stairs are yet twenty feet away. The result is a great surprise in each instance. The lamb picks himself up, and continues down the hill; he soon comes to the conclusion that everything is down hill in his life, and not on a dead level. Upon getting to the foot of the hill, he still tries to continue downward, and as a result runs his nose into the ground, and looks surprised again. He now comes to a place to get up hill, and goes up just as our man starts to go upstairs in total darkness when he thinks the stairs are still twenty feet away. Our lamb is now getting very suspicious. He was pushed over and growled at for following the dog when he thought it was his mother; the shepherd kicked and abused him for following him; he tumbled down hill when he saw nothing unusual in the looks of the ground, and up hill again under similar circumstances. In this frame of mind he comes to a shadow cast by a neighbouring hill. This is the most appalling thing he has yet seen in life. He stands in the bright sunshine; twelve inches ahead of him all the world is black. How shall he get over that terrible line? It must be worse than going down hill or up hill, or running after a dog that growls or a man that kicks. It surely looks much more frightful than any of these things. His mother is in the shadow, and coaxes him to come along, but he will not risk it; he stands on the edge and bawls at the top of his powers. The shepherd with his big foot comes to the rescue, and our little lamb is lifted from sunlight to shadow

on the end of a No. 9 boot. He trots along after his mother for a few yards and meets a new difficulty. This time it is from shadow to sunlight. It looks rough; the situation seems to present no end of difficulties. He walks across the line with fear and trembling, only to find it very simple and easy, and concludes that things are not so bad as they look. He has already begun to find out that things which seem easy in life lead often to disaster, and forbidden things often present no real danger. At this time he is about one hour old; for a whole hour he has been running his respirative, circulative, and locomotive powers as an independent being, and has become quite a lamb. Just at that instant a carriage drives rapidly along the road. His quick eye sees it; he thinks, perhaps, it is his mother, and that she is running from danger. He strikes out after it. It is wonderful what an hour has done for him in the way of development: he runs faster than the shepherd, faster than his mother, and is in imminent danger of getting under the horses' feet or the wheels of the carriage.—*Montana Wool Grower.*

DOGS IN LONDON.—The monthly return of the Secretary of the Dogs' Home, Battersea, shows that 3,563 lost and unmuzzled dogs were taken into the home during August.

RABIES AND MUZZLING.—Mr. John Ferris, L.R.C.P., L.R.C.S.Ed., F.R.C.V.S.L. (Torquay), late of the Army Veterinary Department, writes, "Those who know the nature of this fearful disease will not venture to argue that in this case prevention is not better than cure. It appears, however, that the Privy Council and the London County Council were not unanimous in wishing to abolish this disease from among us. Will you be good enough to allow me to give a few reasons why muzzling of dogs should be effectually carried out throughout the kingdom? 1. Rabies is a specific disease. 2. It can only be propagated by contagion. 3. Climate, season, want of water and of food do not have any influence over it. 4. The virus is of a specific nature. 5. Rabies in the dog cannot be produced except by direct inoculation. 6. The specific virus resides mainly in the secretions furnished by the mucous membrane of the mouth. 7. It never inoculates when it is applied to the sound surface of the skin. 8. The reason so many escape Hydrophobia after being bitten by a rabid animal is the fact that they are wounded through their clothes, and the fangs are cleansed from the virus. 9. The only means of stamping this fearful malady out is by muzzling and establishing a quarantine of all dogs imported. Imagination is said to have a wonderful influence upon diseases of this kind, but we all agree that it cannot be originated unless the virus be introduced from a rabid animal. We certainly have to thank M. Pasteur for kindly undertaking the treatment of cases sent to the Pasteur Institute. Sir James Paget, when speaking at the Mansion House on July 1st as a delegate from the Royal Society, said that the meeting recorded its conviction that the efficacy of the antirabic treatment discovered by M. Pasteur is fully demonstrated. This is most satisfactory so far, but our object should be to afford protection and to do all in our power to prevent the disease, and it is simple enough to muzzle dogs, as they do not object in the least; in fact, they can be taught to fetch their muzzle. Whether a patient follows M. Pasteur's treatment or not, I maintain that whenever he has been bitten by a rabid animal or one suspected of having Rabies the wounded part should be at once excised, and the raw surface freely treated with caustic potash, nitric acid, the actual cautery, etc. I have found sucking the wound immediately and applying nitrate of silver successful treatment. I may here mention a case of a soldier in India, who was bitten on three different occasions by a rabid dog on the hands and fingers, when the above-named treatment was adopted with success. Dogs are frequently reported to be suffering from Rabies when some other disease exists; for example, I have seen Distemper in

dogs show symptoms analogous when the disease is centred in the nervous system, and this is not an infrequent occurrence."

RABIES IN AMERICA.—A horse with all the symptoms of Rabies, ran through the streets of Chicago, and bit two men and eight horses before he was shot. A rabid dog bit several cows near Plainfield, N.J., recently, and a number of them have died of Rabies.

Correspondence.

PROTECTIVE INOCULATION FOR CONTAGIOUS PLEURO-PNEUMONIA.

DEAR SIR,—I was very pleased to see by the Journal for August that you had received and published an account of the experiments conducted in Queensland, Australia, on inoculation for Pleuro-pneumonia. The experiments establish, I may be allowed to point out, what the late Mr. Graham Mitchell and myself have already pointed out, that animals may successfully be inoculated with lymph obtained from the localised external lesion of an otherwise healthy animal, inoculated with lung lymph in the first instance, and that the lymph so obtained is as potent as if taken from the lung.

I enclose you two communications which I have received, and which you might kindly publish, in support of what I have said about the opinion held by Colonial authorities on this subject.

Edinburgh. R. RUTHERFORD.

Office of Chief Inspector of Stock,
Brisbane, Queensland, *June 5th*, 1889.

SIR,—I have by this mail posted to your address a Parliamentary report of the Board appointed by the Queensland Government to assist M. Pasteur's representatives in their experiments on inoculation for Pleuro-pneumonia.

I have followed with pleasure your efforts to induce the British cattle-owners to adopt a preventive, the efficacy of which no Australian cattle-owner who has had practical experience of it would dare to deny.

Permit me to explain that on Dr. Germont's arrival here I informed him that a medical gentleman in rather extensive practice in Brisbane had for years asserted that the abnormal condition produced by inoculation was not that of true bovine Pleuro-pneumonia, nor of any modification thereof; in proof of which he cited the oft-repeated fact that inoculation in the tail did not produce the lung lesions of Pleuro-pneumonia.

Dr. Germont cheerfully accepted the challenge, and stated that he would produce the lesions of Pleuro-pneumonia by inoculating direct into the lung. Instead of that, however, he made the inoculation into the jugular vein, with the result recorded in his report. That calf died of as true a condition of bovine Pleuro-pneumonia as any of the many thousands which have come under my notice during my twenty-seven years' official experience of the disease.

I shall be glad if, when opportunity offers, you will bring this report under the notice of the veterinary profession.

P. R. GORDON,
Chief Inspector of Stock, Queensland.

Brisbane, Queensland, *July 8th*, 1889.

DEAR SIR,—I took the liberty of writing you some weeks ago on the subject of Dr. Germont's experiments on the cultivation of the virus of Pleuro-pneumonia.

I have now established three cultivation stations in this colony, one here in Brisbane under my own care, one at Rockhampton in charge of C. A. Calvert, V.S., the inspector there, and one at Townsville, 1,000 miles north

of Brisbane, at each of which lymph is continually under cultivation through the medium of calves, and tubes containing each sixteen drops sent to the cattle-owners in different parts of the colony, in cases specially made for the purpose. By this means the cattle-owners can inoculate one or two calves, from which they procure as much subcutaneons lymph as will inoculate their whole herd.

On Saturday last, the 6th instant, I killed a calf which I had inoculated on the 13th of June, behind the shoulder, with sixteen drops of virus taken from a bullock that had contracted the disease in the natural way. The œdema extended all along the side of inoculation and the belly, and also extended to the dewlap. The temperature taken immediately before slaughter was 107·4, so that the disease was in full evolution (the temperature usually falls to about 101° immediately before death). From this calf I took 160 tubes of lymph, and could have taken 1,000 if necessary. I then cut it open and bottled off about half a gallon of subcutaneous virus, which I gave to a cattle-owner, and with which he inoculated a large herd. In the connective tissue there was fully a gallon of lymph, which could have been collected and bottled by pressure with the hands.

This case was specially interesting from the fact that for several days before slaughter the breathing of the calf was very laboured, and it also had the typical cough. On opening it (after I had collected the virus in the sterilized tubes) I found the usual lesions of Pleuro-pneumonia present. The left lung was much congested and a part of it hepatized. The pleura-pulmonalis and castalis showed the usual appearances observed in a case of the disease contracted in the usual way. You will have noticed by Dr. Germont's report that he was able to produce a veritable Pleuro-pneumonia by inoculating in the jugular vein; and on two previous occasions the lung lesions have resulted from inoculation behind the shoulder.

I am thus particular in these details because the few opponents of inoculation here (and they are very few indeed) base their opposition on the supposed fact that the abnormal condition of the system produced by the operation is in no sense Pleuro-pneumonia, but Septicæmia; and in proof of their contention, they cite the fact that hitherto inoculation has failed to produce the lesions of Pleuro-pneumonia, ignoring the evidence of Willems, that the operation localises the disease. The experiments of Dr. Germont, as well as my subsequent experience, appears to me to entirely cut the ground from under their feet.

I may state that the temperature of the calf was taken at the time it was inoculated, and found to be 102°. In every instance the temperature is taken by placing the thermometer in the anus and allowing it to remain there five minutes.

If you think that any of the facts here related would prove of any service to your profession, I shall be pleased if you will give them publicity.

P. R. Gordon,
Chief Inspector of Stock.

ANIMAL TUBERCULOSIS.

Sir,—The *Lancet*, like most medical journals published in English, has a happy knack of description. It always prefers to place the cart before the horse in matters of literature. An example of this may be seen in its review of animal Tuberculosis. After alluding to the work of the International Veterinary Congress of 1883, it reminds its readers of Dr. Creighton's work, upon bovine Tuberculosis (1881), by which is implied priority of labour. True, but what kind of labour was it when Dr. Creighton held that the bovine disease had characters distinct from those of human Tuberculosis, when the *Lancet* even acknowledges that there "now appears to be overwhelming evi-

dence of the identity of the human and bovine affections"? In closing its description, the *Lancet* again precedes its remarks, for its "own part," by laying considerable stress on "the arrest and cure of tuberculous lesions," only to show in the next paragraph that these are but the teachings of our well-known veterinarian M. Nocard, whose paper is quoted, which was read before a *medical* congress. And, finally, we are "urged" by the *Lancet* to "suggest and enforce prophylactic measures whereby the bovine 'scourge' may be mitigated amongst the herds, so that it may soon come to be a rare thing for tubercular beasts to be sent to market."

"A READER."

HISTORY OF TUBERCULOSIS.

SIR,—Villemin (1865) showed the disease was communicable by inoculation to the lower animals; Chauveau (1868) found it could be induced by ingestion; Toussaint (1881) announced that the organism of Tuberculosis could be cultivated outside the body, and Koch (1882) proclaimed he had separated, by a special process, the organism, to which the name *Bacillus Tuberculosis* was afterwards applied.

Ask a medical man in England for the history of Tuberculosis, and he will say, Koch discovered the *Bacillus Tuberculosis*, and Dr. Crookshank showed it was communicable to the lower animals. Why is it so? Because it was a veterinary surgeon who first showed the principal method of communication of the disease, and it was a veterinary surgeon also who first cultivated the organism of Tuberculosis outside the body of the animal.

Moreover, ask a medical man for the method of communication of Tuberculosis, and he will answer, *inhalation*, because it was a veterinary surgeon, also, who experimentally showed it was ingestion, even more than inhalation so-called.

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COMMUNICATIONS have been received from W. D. Snowball, Ballarat, Victoria; "A Reader;" R. Rutherford, Edinburgh; F. L. Gooch, Stamford; R. W. Burke, A.V.D., Kilkenny; J. Malcolm, Birmingham; J. Brett, Notts.; A. W. Hill, London; J. Ferris, Torquay; T. J. Mitchell, Thurles; J. A. Nunn, A.V.D., Assam; R. Ward, Baltimore.

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